

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS
edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It contains selected reading pages from the Railroad Gazette, together with additional British and foreign matter, and is issued under the name *Railway Gazette*.
CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information

of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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VOL. XLII., No. 26.

FRIDAY, JUNE 28, 1907.

The discussion on rails at the meeting of the American Society for Testing Materials was disappointing. Before the meeting the general impression prevailed that some truths would be told by men qualified to tell them, and in anticipation of startling revelations the reporters of the daily newspapers were kept out. But not enough was said during the entire three hours of the discussion to tempt any representative of the rail makers to say a word in defense of their practice or output. Sad as this condition is, it is what might have been expected. The Society had here an opportunity to put itself on record against the commercialism which has led to the present conditions. It is true its members are made up of representatives of both the producer and the consumer, but both are equally liable for the loss of human life resulting from the use of defective material. Dr. C. B. Dudley, in his presidential address the evening before, said: "If it is shown that commercial considerations have led to the use of defective materials the moral responsibility must certainly lie with the one who has allowed these commercial considerations to have undue weight, be he either the maker of the material or the one high in authority who has allowed it to be used. * * * Is not the time near at hand when engineers and their principals will be compelled, if not legally, then by the force of public opinion, to acquire by the establishment of laboratories and means of testing, by the making and enforcement of specifications such knowledge of the materials they are putting into structures as will give the public greater security against disaster than it now has?" Yet with this strong text before them they contributed little to the common knowledge of how to make good rails.

The annual meeting of the Railway Telegraph Superintendents, reported in this issue, brought out as good a variety of profitable papers as any meeting in the history of the association; it was so profitable a meeting, in fact, that the members have decided to try the experiment of meeting quarterly hereafter—which will be a successful experiment if they don't try to make the meetings too formal, and if the members keep their study eyes open throughout the time that they are away from home. The output of the present meeting consists of interesting reading both in old fields and in new. For fresh subjects nothing could be of greater interest than the accounts of the experience of the New York Central in long-

distance telephone work, and of the Chicago, Milwaukee & St. Paul in saving 80 per cent. in its expenses for battery power on certain lines. The use of reinforced concrete telegraph posts on the Pennsylvania Lines West of Pittsburg will also be of interest to all readers. Of fresh treatment of old subjects, Mr. Dailey's and Mr. Hope's papers afford excellent examples. If all railroads tested their operators with the thoroughness described by Mr. Hope, collisions would be less frequent. If all superintendents and despatchers would cultivate the high ideals set up by Mr. Dailey, the personnel of the telegraph and station service of American railroads would be so much better that the public would observe the improvement with the naked eye.

A notice was issued on Monday by the Secretary of the American Railway Association to the effect that the Long Island Railroad would withdraw from the per diem agreement on July 1, the date on which the rate is to be raised from 25 cents to 50 cents a day. The Long Island has been receiving from most of its connections a switching reclaim of four days (\$1) on all cars consigned to points in its territory within the limits of Greater New York, but it claims that notwithstanding this reclaim and the enforcement of demurrage against consignees after 48 hours the present per diem arrangement has seriously reduced its net earnings. In view of the increase in the per diem rate the Long Island demanded an increase in the switching reclaim to eight days which, at the 50-cent rate, would amount to a bonus of \$4 a car. This was refused by its connections, and as no compromise could be arranged the Long Island gave notice of withdrawal. If the Long Island was absolutely independent, its action could be understood as readily as that of the Chicago Terminal Transfer, which dropped out of the per diem agreement last year; but it is hard to understand why the Pennsylvania, which is profiting more by per diem than any other road in the country, should allow the Long Island a free hand in taking such a step, which threatens to establish a dangerous precedent. If the Long Island is allowed to name its own rates for the use of cars of other roads, many other terminal roads all over the country will probably demand the same privilege. No announcement has been made by the Long Island as yet as to the basis of settlement which will be offered for the use of foreign cars. What will probably happen is that its connections will withdraw the existing through rates

and routings. Then some shipper will bring a complaint before the Interstate Commerce Commission. The Commission will then have power to re-establish the rates and routes; and, if the roads do not agree on the division of the revenue, will itself prescribe the proportion for each road. Moreover, it would not be surprising if the Commission should also assume to prescribe car-service rates; for they may vitally affect the price of transportation to the consignee.

"Boston's Hard Luck" is the headline on a news item telling how the increase in the per diem charge on interchanged freight cars, from 25 cents a day to 50 cents, to go into effect July 1, will probably add \$5,000,000 a year to the cost of delivering freight in Boston. This estimate is much too large, no doubt; and the real burden, large or small, will fall on a hundred towns, not on Boston alone. Moreover, the railroads themselves will have to bear most of the increase in the burden; they will not be able to find a way to shift it to the consignee. But why call it "hard luck"? Everybody agrees that cars are worth 50 cents a day and that the 25-cent rate has been a hardship on the lender. Boston should consider, not her bad luck, but her good luck in the past; she has been able to get cars for half what they were worth. She has also what seems to be good luck in the Connecticut demurrage law—virtually operative in Massachusetts—requiring railroads to bear the cost of standing cars till they have stood four days. This, however, is really bad luck, for it is unjust to the consignee who unloads his cars promptly. Boston will still enjoy unjust good luck in one direction; for the railroads have failed to agree on a penalty for diverting a car from its proper route, and each road will continue to use other companies' cars in its own local traffic if its conscience is tough enough to allow it to do so. If a railroad in Massachusetts receives a Missouri Pacific or a Southern Railway car loaded with cotton, and sees fit, after unloading the cotton, to keep the car six months for use in local business, it can do so at fifty cents a day; and can make it earn, perhaps, ten times that sum. In the freight car field, "luck" reverses its polarity with bewildering and irrational frequency.

TO TEST THE REASONABLENESS OF A TWO-CENT FARE LAW.

The decision on the Missouri two-cent fare law by Judge McPherson, of the United States District Court, sitting at Kansas City, Mo., handed down last week, is somewhat novel and may furnish a precedent for similar cases pending or contemplated in other states. Bills prohibiting railroads from charging more than two cents a mile for transporting passengers have been passed by legislatures and signed by the Governors of the States of Iowa, Ohio, Illinois, Indiana, Mississippi, North Carolina, Nebraska, Pennsylvania, Minnesota, Oklahoma, Arkansas and Missouri. The attitude of the railroads generally toward these bills is that they are confiscatory, and that the rates fixed are lower than the railroads can comply with without loss. Of course, if this proposition can be maintained, all such bills lack constitutional warrant and must fail of their purpose.

The general principle involved is now well settled. The doctrine laid down by the Supreme Court of the United States controlling these cases is that no legislature, either directly by statute or indirectly through railroad commissions, can establish rates of fare which do not bring a reasonable profit to the carrier upon the cost of the road and expenses of maintenance and operation.

It will be seen, therefore, that the question is now not so much one of law as one of fact. A two-cent fare might, so far as the law is concerned, be upheld in one state and overruled in another. Where the population is dense and travel frequent a two-cent rate may show an excellent profit upon the carrier's investment. In such a state a bill fixing that rate would be entirely constitutional and enforceable. In a state where the population is sparse and passengers relatively few, a two-cent rate would destroy all hope of profit. In such case the law would be clearly unconstitutional and void.

The simple question, then, in all of these cases is one of fact, whether in any particular state the two-cent rate gives a reasonable profit or not. Such an investigation involves a painstaking examination of all material facts bearing upon the question of profit and requires on the part of the court a patient and calm judgment based upon the evidence. Back of all this there is an old-fashioned principle well recognized and repeatedly enforced that the court will enjoin the operation of any law which may take property without compensation, and where such a claim is made with a reason-

able showing of facts to sustain the contention, or at least uncertainty on the subject, it has been quite the universal practice of a court of equity to issue its mandate forbidding the operation of the law until its effect can in due course be ascertained.

It is, therefore, customary in cases under these compulsory rate bills to issue temporary injunctions until the carriers have the opportunity to establish their allegations.

The decision of Judge McPherson in the Missouri rate case is an unusual and interesting exception to the general rule. Starting with the proposition that the rates fixed by the legislature are presumptively reasonable and remunerative, the judge finds himself confronted with a claim to the contrary, and the old-time practice of the court in equity to stop threatened proceedings till their effect is ascertained. He realizes that a smart bookkeeper can make any showing that may be required of him, and prophecies of what may happen under new and untried conditions are a too speculative basis for judgment. Perhaps, suggests the judge, when the law is put into effect, it may so stimulate travel as to make the new rate profitable, even though it be unprofitable under the old conditions. If the legislature is presumed to have acted justly toward the railroads—and a co-ordinate department of the government cannot proceed, in the absence of evidence, upon any other supposition—why not act upon the presumption and, in fairness to the law-making power, allow its statute to operate until that operation demonstrates the confiscatory result. The courts are ever slow to declare a statute void, and never do so unless it be clearly unconstitutional. Applying the test of actual experience is much more apt to lead to a sound conclusion than indulging in speculation as to results of experiments untried except in imagination. By putting the law in effect and watching its operation for a reasonable period, presumption of validity is harmonized with that anxiety of a court of equity to investigate thoroughly a threatened wrong and to thwart it, if the apprehension is shown in fact to be justified.

Acting upon these views, Judge McPherson suspended the injunction process for three months, during which time the two-cent rate shall be operative. At the end of that period the parties are to show the results. If they demonstrate that the rate is incompatible with a reasonable profit to the carrier, injunction will issue pending the final hearing on all the evidence. If the contrary appears, or if the experiment is consistent ultimately either with profit or without it, injunction is withheld till the final proofs come in and show the real merits of the case.

The reasonableness of this disposition of the controversy seems to have so impressed counsel for both sides that they promptly accepted the decision of the court and put it into effect. The result will be awaited with interest.

But it is not the particular result in question that makes a case of this kind of value in the administration of justice. So far as that result is concerned, the scope of the case is narrow, and its effect temporary, even as between the litigating parties themselves. The decision can affect only the road in question. Some other road in the same state may show results, under the same experiment, which would require a different judgment. And what may be true of a given road at a certain period may not be true of the same road at a later period. The real value of this case is that it suggests a practice, a method of procedure in settling a controversy which may be singularly free from question or disturbance. What becomes of the railroad's claims, if at the end of the probation period, it appears that the new rate shows a reasonable profit? And what, on the other hand, can the state officials say for their case, when the experiment clearly demonstrates the absence of such profit?

This precedent ought to be seized with avidity by those carriers who confidently rely upon the justice of their cause. No witnesses can be so persuasive and credible as the mute results of arithmetical calculations. They overthrow contradiction and confuse and nullify sophistry. No document is so probative as the addition and subtraction, with some multiplication and division, of figures, taken from actual earnings and expenses. When they have done their work nothing remains to be said but the funeral obsequies of that cause that gainsays them.

But a far greater effect flows from such a method of trying out a dispute, than the mere effect of disposing of it. And this is the moral effect upon the public. Let a carrier show in this indisputable fashion, the unjust operation of a rate bill, which is accepted on probation and a public opinion is formed which so far as that carrier is concerned becomes the greatest barrier to future encroachments upon its rights, that can possibly be otherwise created. For it has dealt fairly and patiently with the public, and it has proved

its case to the satisfaction of the public, and the opinion of that public, so frightful when unfounded, becomes just as reassuring and helpful when appeased and gratified by a good cause.

THE RAILROADS OF THE WORLD.

The statistics of the railroads of the world published in the June number of the *Archiv für Eisenbahnen* give the mileage of the several continents as follows:

	Miles.		Miles.
Europe	192,251	North America	253,098
Asia	50,593	South America	32,859
Africa	16,538	Australasia	17,441
	259,382		303,398

making a grand total of 562,780 miles in the whole world at the end of 1905, or the nearest date for which reports are made. This is an increase of 12,525 miles, or 2.3 per cent., over the previous year, and is the smallest increase since 1900, it having varied since 1898 from 10,800 miles in 1900 to 16,754 in 1904, while the total additions to the world's mileage since 1898 have been 95,816 miles, an average of 13,688 miles yearly.

Of the increase in 1905, a little more than one-half was in America, 5,891 miles in North America and 426 in South America (including the West Indies). Canada is credited with 990 miles, against 533 the year before, but in Mexico the additions were but 150 miles in 1905, against 1,720 in 1904. In South America, Argentina opened 337 miles, Peru 39, Brazil 36 and the other additions were 12 miles in the West Indies.

In Europe, Germany opened 567 miles, followed by Austria with 466 and France with 430. Perhaps the most notable progress was in Belgium, already with the densest network, which added 3 per cent. to its mileage by building 135 miles, and in Spain, which opened 184 miles, which is more than in any previous recent year. European Russia is credited with but 165 miles in the year, which is the least for many years, and in the country which needs railroads most.

Progress in Asia keeps up, the 2,621 miles in 1905 being more than in any recent year, but not much more. None is credited to Russia, but in British India 1,052 were built and in China 1,019 miles. The latter is an increase of 83 per cent. in the Chinese mileage, and is significant. Japan is credited with but 270 miles, but Korea, which had but 37 miles in 1903, had 662 in 1905, and that is the work of the Japanese.

Only 480 miles were opened in Africa in 1905, but a great many different lines are under way on that continent.

In Australia, 632 miles were opened in 1905. The prolonged drought had prevented growth there. It (including New Zealand) had built but 1,793 miles from 1901 to 1905. It, however, had but about 6,000,000 inhabitants, and the addition was at the rate of 1 mile to 3,350 inhabitants, while in the same four years the 21,224 miles in the United States added but 1 mile to 3,707 inhabitants.

The *Archiv's* statistics of capital invested include all the European railroads except 915 miles, and show for them an average of \$114,424 per mile. For the rest of the world the figures cover 83 per cent. of the mileage, the average investment in which has been \$57,833 per mile. As in previous years, the capital invested in the railroads of this country is exaggerated by including the \$2,638,000,000 which our railroad companies have invested in other companies' stocks and bonds with what they have invested in railroads. In this way, for instance, the \$120,000,000 which the Union Pacific has paid for the securities of other companies is added to the face of the securities which it has bought with that sum, while those securities are still counted as representing the investment of the companies which issued them. Allowing for this, the capital per mile of United States railroads was \$53,355, instead of the \$65,475 reported.

The lowest capital per mile in Europe was \$33,214, in Finland, a narrow-gage system owned by the state. The British railroads, of course, have cost most—\$264,185 per mile. The investment in their 22,433 miles is considerably greater than in all the railroads (90,300 miles) in Asia, Africa, Australia and America, excepting that in the United States. Next comes Belgium, with \$164,698 per mile; France, \$121,361; Austria, \$107,704; Switzerland, \$103,796; Germany, \$101,488; Italy, \$100,151; Russia (in 1903), \$79,419.

Outside of Europe, the low cost of the railroads of British India may be noted, \$30,905 per mile. The Japanese railroads cost a little more.

The aggregate investment in all the railroads in the world in 1905, as nearly as can be ascertained, was \$40,744,000,000, which is

a mighty sum, indeed, yet amounts to but about \$27 per inhabitant. But the railroad capital per inhabitant is \$52 in Europe, and no less than \$135 in the United States. This, be it understood, does not include street railways, trolley lines and their like. The increase in the world's railroad investment during the last year reported was just about \$1,000,000,000. As Africa and Asia have only fairly begun to build railroads, and as in Asia especially there is actual need for scores of thousands miles more, while the improvement of old railroads in new countries is also a pressing necessity, it is easy to see that the world will find use for its savings for some time to come, and if peace is maintained rapid progress may be expected.

THE WORKING OF THE RATE LAW.

The Rate Law, as the amended Interstate Commerce Commission act is generally called, went in effect August 28, 1906. It gave to the Interstate Commerce Commission larger powers in a wider field. In fact, the most important argument against its passage was that the commission was given altogether too much power. Exactly 10 months have now passed since its enactment. This is a long enough time to form an opinion as to the general results which so far have been obtained.

By far the most spectacular proceeding under the new law has been the so-called Harriman inquiry by which a large number of facts, previously matters of record but not generally known or realized by the public at large, were brought out, as well as certain important facts about purchases of the stocks of other railroads by the Union Pacific, which had not before been made public. The final results of this inquiry will not be known until the commission formulates its recommendations based upon it.

What is of more importance to railroads and shippers is the effect of the new powers of the commission on rates and service; that is the action of the commission on complaints brought under the new law. A considerable number of such complaints have been decided since the law went in effect. Perhaps the most striking group of these are cases in which it proved not to be necessary for the commission to pass judgment, because the transportation companies complained of, after the filing but previous to the decision of the complaints, made reductions in rates or improvements in service which were satisfactory to the complainants without further action. The recently settled case of the National Petroleum Association against the Pennsylvania Railroad and a large number of other carriers is a good example. Complaint was made last October that petroleum rates from Ohio and Pennsylvania points were unreasonable and discriminatory and that a charge of \$105 for the return empty movement of tank cars from Pacific Coast terminals to Missouri River points was also unreasonable. Rates from Ohio and Pennsylvania to the Pacific Coast were made up of the local rates to Chicago plus the through rate from Chicago to the Coast. As a result the rates on carload lots of oil in tank cars and barrels from points in Toledo, Cleveland and Pittsburgh territory were from 90 to 98 cents a hundred pounds, while the Standard Oil refineries at Whiting, Ind., secured the through rate of 78½ cents from Chicago common points to the Coast. The defendant railroad companies filed their several answers denying these allegations and the case was assigned for hearing on May 21, 1907. Before the date, however, the defendants published tariffs naming a through rate of 90 cents a hundred pounds on petroleum to Pacific Coast points, to apply uniformly to Chicago and the Ohio and Pennsylvania points mentioned, and abolishing the charge of \$105 for return of empty tank cars. The complaint, therefore, on May 13, was dismissed without prejudice. Without attempting to go into the merits of this controversy, it is reasonable to suppose that if the commission had not possessed the rate making power these changes would in all probability not have been made by the railroads. A number of other cases have been dismissed without decision by the commission for a similar reason.

Two other cases recently decided show that the commission is willing to see the railroad's side of an argument. In one, complainants sought to have station facilities restored at a point in Indian Territory on a line of the St. Louis & San Francisco, from which the railroad station had been moved to a point 3½ miles distant. Although the new location apparently has few more people than the old, it is a junction point and the expense of conducting the station there is shared with another road. The commission decided that besides the economy in that arrangement, removal of the station had not interfered with the interests of the farming population that for-

merly was served at the old station, and therefore held that, without deciding the question of its own power to take action in a complaint involving station facilities, the complainants were not entitled to an order requiring the St. Louis & San Francisco to re-establish a station at the old location. The other case was that of the Board of Trade of Kansas City against four of the most important railroads reaching that city. Complaint was made that the charge of \$2.00 a car for reconsignment of grain shipped to and from Kansas City was unreasonable and unjust as compared with similar practices at St. Louis, Minneapolis and Chicago. It was brought out before the commission that all cars of grain brought into Kansas City are held by the railroads on special tracks with 48 hours free time before demurrage charges begin to run; that this involves additional service, labor and expense to the railroads, particularly because it prevents the use of cars for other shipments; that it is a valuable privilege to grain dealers at Kansas City; that the charge is not made by the railroad when grain is reconsigned over its own line, and that when grain is milled or used in Kansas City this fact is used by shippers to claim absorption of the reconsignment charge on some other car that does go forward from Kansas City. For these and other reasons the commission held that the reconsignment privilege appears to be wholly in the interest of the grain dealers and of Kansas City as a market and that it is not excessive, unjust or discriminatory. This decision was given by the commission under the complete authority which it now has over terminal and special charges.

Perhaps the most important rate case recently decided by the commission is that in regard to rates on cotton and cotton products from points in the South to the Pacific Coast. Here the old controversy by which the South hopes to get as low rates to the Coast as New England, is passed upon. The importance of the decision lies in the fact that it specifically involves discrimination between localities. Southern points are nearer in distance to the Coast than New England points, but pay a lower rate, yet the commission sustains this state of affairs in the following conclusion:

"The fact that such rates from the southeastern states are higher than those obtaining from the New England states does not in and of itself establish the unreasonableness of the higher rates, as the conditions existing at the two localities are dissimilar. The New England mills, which suffer by the competition of the more favorably situated southern mills from the standpoint of production, are entitled to such advantage in rates as they have from being situated at points closer to ports where cheap water competition has been established to the Pacific coast points of consumption."

It is apparent from this decision that it is not the policy of the commission to interfere with the existing general arrangement of rates between different sections of the whole country.

These instances—and they could be supplemented by many others—do not seem to justify the fears of those who argued against giving the commission rate-making power. That body has not undertaken any wild campaign of rate reduction. Instead there seems to be a real and helpful co-operation between the railroads and the commission. In this connection the following remarks of Commissioner Prouty, recently quoted in the *Railroad Gazette*, are of interest:

"Scores of questions have been raised under the new law on which the railroads might have demanded a decision by the courts before obeying the orders of the commission, or accepting its construction of the law, but in every instance they have promptly and cheerfully co-operated with the commission. On the other hand, the commission has tried to avoid imposing unnecessary hardships on the railroads in meeting the new conditions. It is demonstrated beyond doubt that the railroads are in hearty sympathy with the Interstate Commerce law, and that rebates and kindred evils are practically abolished. The great majority of railroad officials are honest and fair-minded, but they have been living under a cloud raised by unscrupulous and dishonest men. To-day every railroad official can follow his inclination to treat all shippers alike, without fear that some official of a competing road will secretly pay rebates in one form or another. The law is designed to protect the railroads as well as their patrons."

This concluding sentence sums up the spirit of the Rate Law.

CONTRIBUTIONS

Page Bascule Bridge.

Chicago, Ill., June 17, 1907.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We note in the *Railroad Gazette* of June 14, 1907, pages 836 to 840, an article by Mr. A. R. Ekstrom, Assistant Engineer of the Chicago & Alton, regarding the Page design of bascule bridge over the Chicago river, recently completed for joint use of the Alton, the Santa Fe and the Illinois Central. This is the first railroad Page bridge yet built. Mr. Ekstrom states that the Page design was chosen because of its being the most economical in cost of construction, and gives \$165,000 as its cost. The bid on a Scherzer

rolling lift bridge for this location was \$153,364. This figure also included the furnishing of the plans and consulting engineering services of The Scherzer Rolling Lift Bridge Company. Mr. Ekstrom's figures on the Page bridge, it would seem, do not include the amounts paid for the plans of the Page design and for consulting engineering services. Mr. Ekstrom says that this Page bridge is moved by two 125-h.p. motors, and that approximately 70 h.p. is required to raise or lower the bridge in 90 seconds. The design for the Scherzer rolling lift bridge for this crossing required only two 50-h.p. motors. The double-track Scherzer bridge built for the Newburgh & South Shore Railway at Cleveland, Ohio, in 1904, is 10 ft. longer than the Page bridge mentioned, yet it is usually operated within 45 seconds with less than 30 h.p.

We trust that you will kindly give our statement the same publicity accorded the article of Mr. Ekstrom.

THE SCHERZER ROLLING LIFT BRIDGE CO.,
BY JOHN T. DICKERSON,
Assistant Engineer.

Interstate Commerce Commission Classification of Operating Revenues.

The Interstate Commerce Commission has issued its classification of operating revenues (First Issue) at the same time ordering that, beginning July 1, 1907, it be used by all railroads under the jurisdiction of the Commission. It is also ordered that, save for accounts kept in order to give comparison with the results of the fiscal year 1907, no account, record or memorandum of operating revenues, except as prescribed by this classification, shall be kept.

The following is a quotation from the letter of Prof. Henry C. Adams, in charge of statistics and accounts, accompanying and explaining the classification:

As indicating the purpose of this classification, it will be observed that the primary accounts are so drawn as to show, first, the amount earned for the transportation of freight upon which should be based the computation of revenue per ton per mile and of revenue per freight-train miles; second, the amount earned for the transportation of passengers, from which may be computed the revenue per passenger per mile; third, the amount earned from all transportation on passenger trains, from which may be computed the revenue per train-mile; and, fourth, other revenue from transportation service, namely, switching revenue, special service train revenue, and miscellaneous transportation revenue. In addition to revenue from transportation, the revenue account includes eight additional primary accounts which cover revenue from services incident to transportation, the expenses incident to which are included in operating expenses.

The aggregate of the revenues covered by the 19 primary accounts listed in the classification gives the "total operating revenues" for the period under consideration, which amount being reduced by "operating expenses" leaves "net operating revenue." If from "net operating revenues" taxes be deducted, the remainder, called "operating income," will represent the amount with which the income account is properly begun. It should be especially noted that taxes are not included in operating expenses, and should not be included when computing the ratio of operating expenses to operating revenues. The only charges in the nature of taxes included in the operating accounts are assessments for highways, sidewalks, sewers, and the like, which should be carried to the appropriate accounts in operating expenses, betterments, or construction, as the case may require.

The classification of operating revenues is as follows:

GENERAL ACCOUNTS:

- I. REVENUE FROM TRANSPORTATION.
- II. REVENUE FROM OPERATIONS OTHER THAN TRANSPORTATION.

PRIMARY ACCOUNTS.

- I. REVENUE FROM TRANSPORTATION.
 - 1. Freight Revenue.
 - 2. Passenger Revenue.
 - 3. Excess Baggage Revenue.
 - 4. Parlor and Chair Car Revenue.
 - 5. Mail Revenue.
 - 6. Express Revenue.
 - 7. Milk Revenue (on Passenger Trains).
 - 8. Other Passenger-Train Revenue.
 - 9. Switching Revenue.
 - 10. Special Service Train Revenue.
 - 11. Miscellaneous Transportation Revenue.
- II. REVENUE FROM OPERATIONS OTHER THAN TRANSPORTATION.
 - 12. Station and Train Privileges.
 - 13. Parcel-Room Receipts.
 - 14. Storage—Freight.
 - 15. Storage—Baggage.
 - 16. Car Service.
 - 17. Telegraph Service.
 - 18. Rents of Buildings and other Property.
 - 19. Miscellaneous.

The accounts are defined as follows:

I. REVENUE FROM TRANSPORTATION.

1. FREIGHT REVENUE.

This account includes amounts earned by a carrier for the transportation of freight.

To this account should be credited a carrier's proportion of receipts for freight transportation; also overcollections made in excess of proper

rates, such over collections to be held subject to claim. To this account should be charged overcharges paid resulting from the use of erroneous rates, weights, or classification; amounts paid for switching charges absorbed; authorized allowances and localized freight arbitraries; also amounts paid for switching or to transfer companies for completing a haul or effecting store-door deliveries, when the cost of such service is included in the rate charge by the carrier; uncollected earnings on freight destroyed in transit and on short and lost freight; also uncollectible undercharges determined after delivery has been made.

2. PASSENGER REVENUE.
This account includes amounts earned by a carrier for the transportation of passengers.
To this account should be credited a carrier's proportion of receipts from the sale of tickets (including tickets for corpses) and the collection of cash fares; also overcollection made in excess of determined rates, such overcollections to be held subject to claim. The account should be charged with amounts paid for fares refunded; tickets redeemed; also amounts paid for transferring passengers and baggage between stations or depots, except in cases where the transfer of both passengers and baggage is provided in the division of the through rate.
NOTE A.—Cash fare penalty collections made by conductors and the proportion of amounts collected on sale of mileage tickets and mileage credentials subject to refund should not be credited to Passenger Revenue.
NOTE B.—Passenger Revenue should be credited with interchangeable mileage tickets only as the mileage therefrom is honored for transportation. Receipts from interchangeable mileage books when sold should be credited to an open account, which account should be charged and Passenger Revenue credited as the mileage is honored.
NOTE C.—When a lessee company transports passengers over the tracks of another carrier on the basis of a proportion of revenue, it should include the entire compensation in its revenues and statistics, charging the appropriate joint facilities expense and rental accounts with the amount paid the lessor company, and the lessor company should credit the same accounts.

3. EXCESS BAGGAGE REVENUE.
This account includes amounts earned by a carrier for the transportation of baggage in excess of free authorized allowances; also packages, articles, dogs, etc., usually transported in baggage cars, for which a charge is made. To this account should be charged all baggage refunds.

4. PARLOR AND CHAIR CAR REVENUE.
This account includes amounts earned by a carrier in fares collected from passengers for seats in parlor, observation, chair, and other special passenger cars operated by railway companies when the expenses of operating such cars are not separable from the expenses of operating trains. To this account should be charged authorized refunds and tickets redeemed.
NOTE.—When the expenses of operating cars of the above classes are separable from the expenses of operating trains, the operation of such cars should be treated as an "Outside Operation."

5. MAIL REVENUE.
This account includes amounts earned by a carrier for the transportation of mails and for the use of railway post-office cars, special facilities, and bonuses for special mail transportation. To this account should be charged fines and penalties imposed by the Government when not collected from agents or employees.

6. EXPRESS REVENUE.
This account includes amounts earned by a carrier for transportation and for facilities on trains and at stations incident to the transportation of express matter, not including the separate rents of offices at stations. (See account No. 18, "Rents of Buildings and other Property.")
When a railway company transacts an express business through its regular railway organization, the earnings therefrom should be credited to this account.

7. MILK REVENUE (ON PASSENGER TRAINS).
This account includes amounts earned by a carrier for the transportation of milk and cream on passenger trains. To this account should be charged refunds and overcharges on milk and cream so carried.

8. OTHER PASSENGER-TRAIN REVENUE.
To this account should be credited all amounts earned by a carrier incident to the operation of passenger trains not otherwise provided for.

9. SWITCHING REVENUE.
This account includes amounts earned by a carrier for switching service performed on the basis of tariffs. To it should be charged all overcharges on such switching.

10. SPECIAL SERVICE TRAIN REVENUE.
This account includes amounts earned by a carrier for running chartered trains, either on a basis of a rate per mile, or a lump sum for the train; for handling circus or theatrical company trains under contract when specific amounts are charged for transportation between designated stations; for running chartered trains for the Federal or State governments carrying troops, munitions of war, camp outfits, etc. To this account should be charged refunds and overcollections on such business.

11. MISCELLANEOUS TRANSPORTATION REVENUE.
To this account should be credited all amounts earned by a carrier from transportation not otherwise provided for.

II. REVENUE FROM OPERATIONS OTHER THAN TRANSPORTATION.

12. STATION AND TRAIN PRIVILEGES.
This account includes a carrier's revenues from weighing, vending and other automatic machines located at stations; from advertising at stations and on trains; from news companies or others for the privilege of operating news stands at stations and selling papers, periodicals, fruit, etc., on trains; from telephone companies for the privilege of installing and operating commercial telephones at stations; and from other similar sources.

13. PARCEL-ROOM RECEIPTS.
This account includes a carrier's revenue from the operation of parcel rooms, the expenses of which are included in operating expenses.

14. STORAGE—FREIGHT.
This account includes a carrier's revenues for storage of freight. To it should be charged authorized refunds.

15. STORAGE—BAGGAGE.
This account includes a carrier's revenues for storage of baggage. To it should be charged authorized refunds.

16. CAR SERVICE.
This account includes amounts accruing as penalties for delay in loading or unloading cars (demurrage). To it should be charged authorized refunds.

17. TELEGRAPH SERVICE.
This account includes a carrier's revenues from commercial telegraph business transacted by it when the expense of transacting such business cannot be separated from the expense of conducting the railway telegraph service; amounts received from telegraph companies, whether proportion of earnings or otherwise, for the privilege of transacting a commercial telegraph business in offices along the carrier's lines, when the carrier furnishes some service of its employees whose wages are included in operating expenses.
NOTE.—When a telegraph company rents the telegraph line of a carrier and pays all expenses incident to its maintenance and operation, the rent received should be treated as Income.

18. RENTS OF BUILDINGS AND OTHER PROPERTY.
This account includes a carrier's revenues from rents of buildings, land, and other property, such as depot and station grounds and buildings, union depots, general and other offices, rooms rented at stations, docks, wharves, ferry landings, elevators, stock yards, fuel yards, repair shops, section and other houses, etc., when such property is used in connection with operations and the expense of maintaining and operating it cannot be separated from the expense of that portion used by the carrier.

19. MISCELLANEOUS.
This account includes a carrier's revenues from operation not otherwise provided for; also collections from individuals and companies for the privilege of handling freight and passengers over a carrier's wharves and docks; amounts received from others for mooring and anchoring boats at such wharves and docks, and for water furnished them when the water plant is operated by the carrier; receipts from coal and ore docks, stock yards, and grain elevators when not treated as "Outside operations;" amounts received as trackage for detouring trains; collections for the use of a carrier's bridge by pedestrians, street-car lines, vehicles, etc., when the expense of maintaining and operating such property cannot be separated from the expense of that portion used by the carrier.
NOTE.—When a bridge of one carrier is used by another carrier and such use is paid for either on the basis of a flat rent or a charge per train mile, or a toll per passenger, per ton, or per car, the revenue therefrom should be credited to appropriate accounts.

Car Accountants' Report.*

RAILROAD SERVICE MAIL.

The committee on this subject is not prepared to recommend a limit of size or shape but offers for consideration a resolution to limit to 10 lbs. the weight of parcels destined to connecting lines. For valuable packages, between points within the system, the committee recommends a label of distinctive color with instructions that such packages must be received for. The committee recommends that the supervision of railroad service mail be put in charge of a single designated officer, preferably the general baggage agent.

OFFICE METHODS.

The committee on this subject recommends that claims for unreported per diem be not made within three months, thus giving the debtor time to recheck his records. Where errors are found the unreported per diem should be included in the next monthly report as a separate item. The committee recommends that the responsibility for per diem charges of railroad companies' cars on non-per diem roads be fixed on the road making the delivery. Such roads should promptly report all such service without waiting for a demand from the owner. The committee recommends that interchange reports be made in quadruplicate by the delivering road. All copies should be certified by the receiving road, after being checked, the original and one copy then being returned to the delivering road. The committee recommends that when a home-route car is ordered under M. B. C. rules the order should be promptly acknowledged, and if not acknowledged within 10 days then to be repeated, with a reference to the date of the first order. The committee offers a proposed standard junction report for private cars. As to a proposed uniform agents' car report, embracing information required by demurrage managers, the committee thinks no action should be taken. Neither does it recommend a uniform method of handling per diem discrepancy claims.

To reduce the work of correcting errors the committee recommends that in recording cars memoranda of errors in reports shall be made on suitable tags, of distinctive color, and memoranda of omissions from reports be also made on distinctive tags. By sorting these two sets of tags and putting them in numerical order,

*Abstract of reports made by committees to the annual meeting of the Association of Transportation and Car Accounting Officers, at St. Paul, June 25 and 26.

the shorts can be matched up against the overs and a large share of the errors located.

PER DIEM.

The committee on this subject recommends that switching re-claims under rule 5 be incorporated, each as a separate item, in the regular switching bill.

CONDUCTING TRANSPORTATION.

The committee on this subject proposes that records of locomotive power be kept on the basis of a unit of 25,000 lbs. tractive power per hour, so that, for example, a locomotive of 25,000 lbs. tractive power, available for one whole day, would represent 600,000 units. Engines should be recorded under four heads: A, in the mechanical department; B, in the operating department in actual road service; C, operating department, all other service; D, reserve.

Respecting the building of freight trains according to destination of cars, the committee advises that in many instances it is desirable to hold freight 24 hours if necessary so as to follow the rule of strict station grouping.

The committee submits under 15 heads the essential instructions for a traveling car agent. The roads which have employed men in this work have found the service decidedly beneficial. We quote some of these instructions. The traveling man should see that interchange reports are kept as carefully as any report involving money; should see that agents and their men have the right ideas as to gathering data. He should make a thorough check of the cars in the yard and then compare his notes with the agent's on-hand report. The agent should keep a correct and permanent record of all facts connected with demurrage and cars liable to demurrage. Cars arriving during the night should, if possible, be placed before 7 a.m. in order to reduce the delay under the demurrage rules. The inspector should impress on the agent the absolute necessity of impartiality in furnishing cars to shippers. The inspector should ride over every division on the way-freight and converse with the conductors. He should inform agents in a general way of the nature of his report; that is to say, the agent should know how his record is going to appear at headquarters. The inspector should send his report, or parts of it, by telegraph, when necessary.

May Railroad Law.

The following abstracts cover important cases applying to railroads decided by the Federal courts in May. These include the important North Carolina Railroad Commission case, in which the Commission was sustained by the Federal Court:

Consolidation under Indiana Statute.—The Indiana Statute which provides that "any railroad company shall have the power to intersect, join and unite its railroad with any other railroad" and forbidding the companies to merge and consolidate their stock under certain conditions does not limit the right of consolidation to two companies, nor is it essential when more than two companies consolidate that the line of each shall intersect the line of the other. The stockholders of railroad companies hold their stock subject to the right of a majority of the stockholders to effect such a consolidation. *Bonner v. Terre Haute & Indianapolis*, 151 Fed. Rep. 985.

Assumption of risk.—Under the provision of the Federal Employers' Liability Act of 1906 that no contract of employment shall constitute any bar or defense to any action brought to recover damages for personal injuries to or death of such employee, the defense of assumption of risk—which is based on an implied contract—is abrogated, though the danger was obvious, according to a decision of Judge Hanford. *Mallory v. Northern Pacific*, 151 Fed. Rep. 1018.

Interstate Commerce defined.—Judge Speer in a recent charge to a grand jury defined the term "Interstate Commerce." He says: "Interstate commerce comprehends intercourse for the purposes of trade in any and all of its forms, including transportation, purchase, sale and exchange of commodities between the citizens of different states, and if any commercial transaction reaches an entirety in two or more states, and if the parties dealing with reference to that transaction deal from different states, then the whole transaction is a part of interstate commerce of the United States and subject to regulation by Congress under the Constitution." In re charge to Grand Jury, 151 Fed. Rep. 834.

Removal of causes.—The Death by Wrongful Act statute of Missouri imposing an absolute liability for injuries resulting in death does not give the representatives of one killed in a railroad accident a right of action against the employee responsible for the accident so that by joining such employee with the railroad company a removal of the case from the state to the Federal Court can be prevented. *Chicago, etc., R. Co. v. Stepp*, 151 Fed. Rep. 908.

Dressing rooms in sleeping cars.—Applying the rule that while a carrier is required to use the utmost diligence and care in providing reasonably safe cars, it is not an insurer of the absolute safety of its passengers, but has discharged its duty in respect to its cars when it has supplied the best instrumentalities that a highly prudent person would have supplied in the same business in the then known condition of the business, the Circuit Court of Kentucky

has held that the failure of a railroad company to equip the ladies dressing room of a sleeping car with seats and handholds did not constitute negligence *per se*. *Ozanne v. Illinois Central*, 151 Fed. Rep. 900.

New Jersey statute of limitation.—The New Jersey statute providing that all actions for personal injuries against railroad companies must be brought within two years did not impliedly repeal a special provision in the charter of the Lehigh Valley Railroad as a successor of the Amboy Railroad which limited the same for bringing actions against it for personal injuries to one year. *Lehigh Valley v. Comer*, 151 Fed. Rep. 559.

Employer's Liability Act.—The Circuit of the Eastern District of Arkansas sustains the validity of the Federal Employers' Liability Act. Judge Trieber holds that the act is not void on the theory that it applies equally to intrastate and interstate commerce, but that its provisions are separable and it is valid where invoked by an employee engaged on a train actually employed in interstate traffic. *Spain v. St. Louis & San Francisco*, 522.

Another decision sustaining the constitutionality of the Federal Employer's Liability Act.—Judge Speer in the Circuit Court of the Southern District of Georgia proceeding on the theory that every judicial doubt should be resolved in favor of a statute and that a court should not adjudge a statute invalid unless in its judgment the violation of the constitution is clear, complete and unmistakable, has sustained the recent Federal Employers' Liability Act. The Federal courts are now hopelessly divided on this question and a decision of the Supreme Court alone can settle the vexed question. *Snead v. Central of Georgia*, 151 Fed. Rep. 612.

Lien of bank on deposits after receivership.—The bank in which the funds of a railroad company—the Pere Marquette—were deposited subject to check and which held the demand notes of the railroad company had no lien on funds received after the appointment of a receiver giving it the right to apply the funds on the notes. Under this view the deposits became the property of the receiver on his appointment. *Horn v. Pere Marquette*, 151 Fed. Rep. 626.

Rules for governing movement of trains.—A railroad company may be held liable for injuries to an employee injured on its premises because of the failure of the company to prescribe proper rules and regulations for the movements of its trains. *Union Railway Co. v. Tate*, 151 Fed. Rep. 550.

Service of process on foreign corporations.—The mere fact that a foreign corporation owns a majority of the stock of a domestic corporation, does not justify the service of process upon such foreign corporation on the theory that it is doing business in the state through the agency of a domestic corporation, if the domestic corporation retains its own officers, has property of its own and is responsible for its contracts and to persons with whom it deals. *Peterson v. Chicago, Rock Island & Pacific*, 27 Sup. Ct. 513.

Doctrine of "Discovered Peril."—The Circuit Court of Appeals of the Fifth Circuit accepts the doctrine of "Discovered Peril" which makes a railroad company liable for an injury caused by its train to a person on its tracks, whether at a public crossing or other place, notwithstanding the contributory negligence of such person, if the train operatives should, in the exercise of reasonable care, have discovered his peril in time to avoid injuring him, although they did not in fact make such discovery in time. *Texas & Pacific v. Modawell*, 151 Fed. Rep. 421.

Discrimination in demurrage charges.—A demurrage charge of \$1 a day for the time cars are left standing on the tracks after the time given for unloading is not discriminative because at another station facilities are furnished for storing unloaded cars and the rate charged is less than the demurrage charge, if it is a fact that the demurrage charge for loaded cars is the same at both places, though there are no such facilities at the station where the complaint originated. *Michie v. New York, New Haven & Hartford*, 151 Fed. Rep. 694.

Power of state commission to compel railroad companies to make connections.—The Supreme Court holds that the power of the state to regulate railroads extends to securing to the public reasonable facilities for making connections between different carriers. Applying this principle it declares that an order of the North Carolina Railroad Commission requiring the Atlantic Coast Line to restore the connections at Selma with a train of the Southern Railway, which afforded the principal means of travel between the eastern and western parts of the state, is not so arbitrary and unreasonable as to amount to a denial of due process of law, or to a deprivation of the equal protection of the law guaranteed by the constitution, if other connections are inadequate for the public convenience, although it would involve the operation of an extra train at a loss, so long as the income of the railroad company from its business in the state affords adequate remuneration after allowing for the loss from operating the extra train. The question whether orders of a railroad commission in such a case are unreasonable or beyond the scope of the powers of the commission is regarded as a local and not a Federal question. *Atlantic Coast Line v. North Carolina Corporation Commission* 27 Sup. Ct. Rep. 585.

Service of process on foreign railroad company. A railroad company incorporated in one state is not regarded as doing business in another state, in the sense that process can be served on it in such state, merely by reason of soliciting business for its road through an agent therein. *Green v. Chicago, Burlington & Quincy, 27 Sup. Ct. Rep. 595.*

Seniority vs. Efficiency.*

Many railroads are hampered in placing preferred men, by seniority clauses in agreements existing between the operators and the company; but these seniority rules, as I have seen them, may be applied without forcing incompetent men into positions of importance. If the superintendent of telegraph creates these positions and arranges the salaries, seniority should be required to fully qualify, before a single position is filled.

Every telegraph office that is kept open under strained conditions, by reason of short or incompetent force, is a hazardous and expensive venture for the company; for as long as the wires are cut in at a station, despatchers will depend upon making some use of the office, regardless of the efficiency of the operator employed. Every operator employed must be relied upon for competency and safe judgment.

Possibly "scarcity of operators" is caused by an effort to maintain too many offices, with a blanket allowance for telegraph service. If the necessity of the number of offices maintained were as constantly and carefully examined into, one by one, as the salary of each operator is checked monthly by the auditor's office, would not many offices be closed? And if, when these practically useless offices were closed, an amount of the money saved could be used in making salaries at other offices more attractive, would the shortage of operators decrease, and would the reliability of the service improve? The insufficiency of reliable and expert operators is one of the telegraph problems of to-day.

The Master Car Builders' Convention.

The forty-first annual convention of the Master Car Builders' Association was held on the Steel Pier, Atlantic City, N. J., June 17, 18 and 19. The opening session was called to order at 10 o'clock by the President, W. E. Fowler (C. P. R.). Mayor Stoy, of Atlantic City, delivered the address of welcome, F. W. Brazier (N. Y. C.) responding on behalf of the association. President Fowler then delivered his address, which was in part as follows:

PRESIDENT'S ADDRESS.

* * * This association need fear no criticism on its work of the past; its history is stamped indelibly on the traffic of this country, for its rules for interchange of cars and its standards of construction have made it possible to load a railroad car in far-off Edmonton, in the Canadian northwest, and to deliver it, with its load undisturbed and unbroken, at Mobile, New Orleans, or the City of Mexico. This continent is in full possession of these benefits, and it is hardly possible to realize to what extent progress and civilization would have been retarded if these benefits had been absent. But, our work is not done. Never before in the history of railroading has there been so much attention given by the Government, by the public, and by the thinkers of this continent to the railroads and their operation. The railroads have become a vital part of national progress, and the most rapid, the most safe, the most convenient and the most economical is the kind of service that is required, and our part in the development of such service is so plain, so unmistakable, that we must more than ever give our best thoughts, our most earnest consideration to the problems thus set before us.

It is a matter of congratulation that the relations of this association and the Interstate Commerce Commission have always been of the most cordial character.

Your committees have under consideration, this year, matters extremely important, made so very largely by the larger carrying capacity of the freight car and the increased power of the locomotive, intensified by the immense growth of the business of the country, and these have made demands upon the railroads which have at times been impossible to satisfy. The report of the Arbitration Committee is indicative of these changed conditions, and embodies a number of suggested changes to the rules of interchange, which, coming from so conservative a body, indicates that operating conditions are changing very rapidly.

Here followed a brief résumé of the different reports, in the course of which Mr. Fowler said: As stated in the report of the Committee on "Cast Iron Wheels," the wheel-makers make an earnest request that the wheel recommended in this report as standard be generally accepted and adopted by the railroad represented in this convention, and your president is pleased to heartily recommend that this be done. It was stated by the wheel-makers, in the joint committee meeting, that one of the most serious difficulties they had to

contend with was the great variety in design of wheels they were asked to make, entailing the expenditure of a large amount of money in making so many patterns, and making it impossible for them to carry a stock of standard wheels, which, if carried by them, would enable them to fill orders promptly and satisfactorily. As the general use of a standard wheel would result in great economy, I think this would appeal to you. * * *

The reports of the Committee on "Stresses to Which Wheels for 100,000-Pound Capacity Cars Are Subjected," on "Brakeshoe Tests," on "M. C. B. Couplers" and on "Airbrake Hose" indicate the necessity for a somewhat radical departure in the policy of this association. The problems which confront us as master car builders are becoming daily more complicated. In early days car construction was crude, and the relation of various parts of cars to each other were such as could be readily understood by men without scientific education. The means of improvement, made use of from time to time, were then not necessarily complex, but it appears quite evident that the future will not yield great improvements except as they may be reached by painstaking, laborious and continuous study and investigation.

While, therefore, this association may well look with pride upon its work of the past in the development of better designs, in the arranging of standards, in the unification of practice, and in making possible the rapid interchange of cars, we must not forget that the problems of the future will necessarily be more complicated, will require greater care in investigation, and increasing assistance from science. The work performed by the committees of this association has been productive of splendid results, and this association will necessarily for a long time to come, depend upon its individual members to serve upon such committees as faithfully as many have done in the past. There are, however, some committees, the work of which has fallen very largely, and, in some cases, entirely upon its chairman, and your president deprecates this, believing that in a great many cases the members could, by the exercise of a little self-denial, have attended one or more meetings of the committee to which they belong, and have thus added very much to the value of the report made by the committee.

Some of the railroads of this continent have, in times past, generously contributed not only the time of officials, but, in many cases, materials and equipment toward the advancement of committee research, and I believe that there will always be a spirit of this kind manifested by progressive railroads. But, the problems confronting the Master Car Builders' Association, which were in the past solved by the exercise of good judgment, by careful observation, or by averaging the experience of all interested parties, must in the future, in my opinion, be supplemented by the precise methods of science and materials which were unknown to our fathers, but which promise valuable assistance, must, in many cases, have their physical properties and chemical composition made known before they can be used in practical railroading.

Considerations such as these suggest to me the desirability of the organization by the Master Car Builders' Association, of an expert staff, which would be qualified by education and training to handle problems either mechanical, chemical or physical. Such an organization should have its home in a laboratory befitting the dignity of the great interests represented by this association, such as would be possible at Purdue University, or a similar institution. Not only would the members of such a staff be able to give their undivided attention to the problems of this association, but the sustained character of their efforts would make their work cumulative. Bringing to bear upon the problems with which they were confronted minds trained for scientific research and habituated to the study of railroad problems, the work of such investigators should be invaluable. Operated under the direction of the executive committee of the Master Car Builders' Association, and sustained by all the railroads of the country, such a laboratory and staff, actually in co-operation with the working committees of this association, would return many times its cost to the railroads of the country.

I am aware that this organization cannot be arranged for in a day, it must have a small and inconspicuous beginning; but, as that has been the history of the association I do not think that should deter us from entering, at any early date, upon a plan which will permit an early organization of a small staff of this kind, upon a permanent basis, and I would recommend that this convention request its executive committee to consider and act upon this idea if it deems it advisable.

It is hoped that the members will realize that the topical discussions, which take place at the noon hour, are quite often forerunners of more elaborate discussions at subsequent conventions, and some of the topics which will be discussed are, in my opinion, intimately connected with some of the important problems now confronting the railroads of the country, and I hope that the interest in these noon-hour discussions will not flag.

Your president is pleased to note, in the report of the committee on subjects for discussion at the convention of 1908, that the comprehensive problems of better and more economical service of freight cars seem to have been uppermost in the minds of the committee.

*Extract from a paper by J. C. Browne, Missouri Pacific, read before the Railway Superintendents at Atlantic City.

Your president is of the opinion that the most important factor in this problem is the question of economical maintenance. Too little consideration has been given this matter in the past, freight car repair yards have been located in inconvenient, out-of-the-way places, repair tracks have been set too close together for convenience, the equipment for repairs, both animate and inanimate, has not been of the best, and the consequence has been that cars which should have been returned to service promptly, and with repairs properly made, have been held out of service longer than necessary and were not properly repaired. Never before has there been such pressing necessity for intelligent work, for proper tool equipment and for shelter for the men employed than at the present time.

Railroads all over this continent have, during the past year, been confronted with a demand for cars which it has been impossible to satisfy, and it would have been still impossible if all of the cars held out of service on account of being in bad order had been repaired promptly and put into service. The held out cars would, however, have helped very materially, and would have stopped criticisms made by persons without any real understanding of the situation. It is a reflection on good judgment when vehicles are held out of service for which there is a paying demand at the time, and it would appear that with the attention now concentrated upon the railroads that your best efforts are not desirable, but are absolutely necessary for a betterment of the conditions I have referred to.

The other subjects recommended by the committee for reports and topical discussions are all important, more particularly those relating to freight car pooling and the effect of hump yards on freight car damage.

Some problems in steel car construction are also recommended by your committee for investigation during the coming year, both with regard to freight car and passenger car design, and as there is no greater foe to the steel car than rust the subject of protective coatings must necessarily be of great interest, as it would appear that a coating which would be both elastic and tenacious would add very much to the value of our steel cars to-day.

The ventilation and heating of passenger cars being a matter under consideration by state and national governments, should also receive the consideration it deserves, and I hope that the committee appointed will arrange to furnish the convention next year some valuable data on this subject.

Although your former presidents have called your attention to the same fact, I must again call your attention to the increasing varieties of M. C. B. couplers, which entails the tying up of an enormous sum in repair parts carried in stock by railroad companies, and I believe that same restriction should be placed upon the introduction of new and untried couplers and a limit be placed on the number of couplers for which railroad companies must carry their parts, the listed couplers to be specified by name, railroads being permitted in case of failure to scrap couplers not on the list, or to return them to the owners at the owner's expense. This plan may not meet with the approval of some members of this association, but if this recommendation results in a restriction of some kind being placed on the flood of couplers, a much needed relief will be secured.

The reports of the proceedings of the recent convention of the Airbrake Association, at Columbus, Ohio, are now in circulation, and I would strongly recommend their perusal to the members of this association. I may say, however, in passing, that the essence of their conclusions appears to me to be better maintenance, and I am strongly of the opinion that we must have better maintenance of airbrakes if we are to meet demands for increasing rapidity in operation of our freight trains.

Your executive committee of this year in making up committees adopted a rule which I would much commend—namely, that of appointing no member on more than one committee, endeavoring also to so arrange committees that all members could be assembled with the least loss of time, and I would suggest that this precedent be followed as closely as possible.

To other associations, such as the Master Painters' and Master Blacksmiths' associations, we, as master car builders, are much indebted; the associations in their conventions, by discussing their specialties, relieve this association of much detail work and add very much to the general efficiency of the mechanical department of our railroads.

And the railway clubs—who can estimate the benefits received by this association and by the railways of this country from the work of the railway clubs? Their periodical meetings, which are preparatory and supplementary to these conventions, permit more detail discussion of many subjects than is practicable on the floor of this convention, and the continued growth of these clubs is a strong evidence of the value placed upon club membership by our practical men and they deserve our heartiest support.

The Secretary reported a total membership of 614, divided as follows: Active 377, increase for the year 21; representative 249, increase 6; associate 14, increase 1; life members 15. The number of cars represented in the association is 2,254,397, an increase of 207,070. Thirty-three railroads and private car lines have signified their desire to become subscribers to the Rules of Interchange. The

expenses for the year were \$13,072 and the balance in the treasury \$6,641. The annual dues for the ensuing year were fixed at \$4 by the Executive Committee.

E. A. Moseley, Secretary of the Interstate Commerce Commission, addressed the convention. His address was printed last week.

John T. Chamberlain was elected a life member of the association.

DISCUSSION OF COMMITTEE REPORTS.

Revision of Standards and Recommended Practice.—C. A. Seley (C., R. I. & P.) read the report by paragraphs.

The recommendations covering revision of standard journal box 5 in. x 9 in. were referred to letter ballot for adoption. Mr. Seley pointed out that while the proposed change making a lip on the inside of the box was not objectionable, the committee did not think it necessary or an improvement over present practice and hence did not recommend its adoption with the other modifications as standard.

The recommendations covering revision of standard journal box 5½ in. x 10 in. were referred to letter ballot for adoption as standard without discussion.

The proposed changes in standard axles were referred to letter ballot, Mr. Seley explaining that the changes in the size of the fillets to $\frac{3}{4}$ in. was largely a matter of improving shop practice.

The form of wheel tread and flange was laid over pending the report of the committee on "Cast-Iron Wheels."

All that part of the report relating to brake-beams and other parts was accepted and referred to letter ballot for the adoption of the recommended changes in the drawings and text.

G. W. Wildin (L. V.): I object to cutting out recommendation G in the committee's report. There is a standard width of truck, and you can also construct a truck beam that will go in this truck. There are many brake-beams made to-day that will not go into the M. C. B. truck.

Mr. Seley: The committee on arch bars this year recommends increasing the wheel base, which will have some bearing on this point. If they lengthen the wheel base it will take care of that.

Mr. Wildin: It will, unless the brake-beam manufacturers go to a still deeper beam after we get a longer truck.

Mr. Seley: This matter of brake-beams is not in as good shape as we would desire to have it. We have had available for years in brake-beams on a large number of cars standard rolled sections, which are available, yet the 7,500-lb. limit cuts out everything but an uneconomical section. I cannot see the necessity for the 15,000-lb. beam in freight service, and in my opinion we would be better off if those limits had never been set. We are doing good braking with brake-beams made of I-beams of 12½-lb. section under cars of moderate weight, and we have thousands of such cars. If you adopt this 7,500-lb. section you are using a beam which does not correspond to the requirements, and I believe that it would be wise, that these limits should be reduced to 6,500 lbs. and 12,000 lbs. Instead of 7,500 lbs. and 15,000 lbs., with the same limit of deflection as now specified. I do not wish to have it understood that I recommend to reduce the efficiency of braking. On heavy curves, and curves requiring a high braking power, we must put on a heavy beam, but for the vast majority of light weight and medium weight, cars already on our tracks, and which will be there for a number of years, we have no beam which will properly fit those cars and for which we can use an economical section.

The recommendations to and including paragraph 87 were referred to letter ballot without discussion.

Paragraph 103 relating to the position of brake shaft caused considerable discussion.

Mr. Seley: There are a large number of cars with brake staffs on the right side, and a number of cars with double brakes, one right and one left, and if the inspection of cars is going to be very close this recommendation for shafts to be located on the left side might work a hardship. The committee proposes to add one word in paragraph 98, making it read, "The brake shaft should be *preferably* placed on what is the left-hand corner of the car." The word "preferably" then indicates that the practice of the left-hand side as carried out in the remainder of the standards would be the preferable location.

Mr. Demorest (P. L. W.): The location of the brake staff on the right-hand side of the car permits the drawing in of the ladder nearer to the center line of the car. There have been a number of instances of trainmen being injured when going up the ladder rounding a curve where the end ladder was located as near the outside edge of the car as the sketches show, and in order to get a safer position the end ladder could be drawn nearer the center of the car by placing the brake staff on the right-hand side.

R. P. C. Sanderson (S. A. L.): The standard sheet has called for a brake shaft on the left side for some time, and the purpose of the association is to get uniformity. I do not want to see alternatives put in a sheet that is manifestly for the purpose of obtaining uniformity. It is not my purpose, however, in objecting to the change to require all cars fitted with brake staffs on the right-hand side to be altered.

C. A. Schroyer (C. & N.W.): This is a guide for the construction of new equipment and not the alteration of old.

Mr. Seley: Mr. Schroyer's statement that this is applicable only to new equipment is not correct, as the standards for the protection of trainmen is the guide of the association and also for the inspectors of the Interstate Commerce Commission in the examination of cars all over the country, and while the location of the brake staff is not a point which comes under the law, at the same time we do not want to have this inspection tangled up by the practice on what might be new cars and what might be old cars.

The recommendation of the committee with the word "preferably" inserted was referred to letter ballot for adoption.

Paragraph 111 was amended by striking out the words "not less than" and inserting the word about making the sentence read, "The steps to be about 12 in. long * * * and the tread about 8 in. below the bottom of the sill." It was then referred to letter ballot.

Referring to paragraph 120 Mr. Seley said: Since the committee's report was printed, the construction of a large number of hopper cars has been brought to our attention, and particularly cars in which there are two posts in the center of the end of the car, which are very convenient for the application of the end ladder. It would be well to standardize on hopper cars an additional location of the end ladder, either at the side as noted for ordinary cars, or in the center, and the committee would make a recommendation therefore that an additional cut be added showing this optional arrangement on hopper cars for the location of the ladder, and that a paragraph be inserted in the text to cover the construction.

W. F. Bentley (B. & O.): Referring to paragraph 115, I do not agree with the committee in regard to the location of grab irons and handholds. On many refrigerator and other cars it is impossible to locate the handholds on the roof of the car about 15 in. from the edge of the car. If the distance was made from 2 in. to 18 in., you would cover that class of cars.

The suggestion that the location of the roof handhole be changed from about 15 in. from the edge of the car to not less than 2 in. nor more than 18 in. from the edge of the car was accepted and referred to letter ballot.

The suggestion that the word "coupler" be substituted in place of "drawbar" throughout the standards was carried.

All the recommendations of the committee down to paragraph 157, including the proposed new drawings, were accepted and referred to letter ballot for adoption.

At the suggestion of R. L. Klein (P. R. R.) the committee agreed to revise paragraph 158 making it optional to place a vertical side handhold on drop end gondola cars, and the paragraph as amended was adopted.

Referring to paragraph 182 Mr. Seley said: The question has been brought up since the report was printed, relating to tank cars which have a tank so large that a side railing is not applicable, and where handholds directly attached to the tank can be used. The committee was asked to provide for them. The present class of tank cars should be provided with horizontal grabirons or handholds about 24 in. long on the sides over the steps, but cars provided with safety railings on the sides do not require side grabirons or handholds. The first portion of the clause in paragraph 177 covers the situation, where it is desired to include handholds in connection with safety railings on tanks having large capacity. We would, however, recommend that an additional cut be made showing a tank car without side railings, but with the style of handhold which will be suitable for that construction. The present Fig. A-7 as shown should be revised in regard to the relative connection of the step and end of the handhold. The step is too far out, and the end of the hand-rail should be brought forward not to extend beyond the step. The recommendation of the committee was adopted and referred to letter ballot.

Subsequent recommendations to paragraph 217 were referred to letter ballot without discussion.

Under the head of "Collection of Salt Water Drippings" a letter from the Maintenance of Way Master Painters' Association was read asking that the Master Car Builders' Association endeavor to devise some plan whereby the salt brine from refrigerator cars can be retained in the cars to be discharged at designated points where no damage could be done bridges and other iron work. No action was taken on it.

In connection with paragraph 232 Mr. Seley read the following letter from W. F. Allen, Secretary, American Railway Association:

"Mr. Arthur Hale, Chairman of the American Railway Clearing House, has requested me to take up with the Master Car Builders' Association the question of marking cars with the standard initials, with the suggestion that the matter be referred to a committee with power to act.

"Mr. Hale also suggests that the initials and numbers should be painted in some uniform place on each car and not too high up.

"I will say in this connection that Mr. Hale has also taken up the subject of standard initials for marking freight cars, with the Association of Transportation and Car Accounting Officers."

The object of this suggestion is to facilitate car checking, particularly at night, the intention being to recommend a uniform loca-

tion and height of the initials and numbers of cars, and with this understanding the suggestion was approved by the committee which offered the following additional paragraph to the section on stenciling cars and reading as follows:

"The initials and number of all cars having a superstructure, which will permit, shall be placed about midway between the door and corner post on the left-hand side of the side of the car and be arranged at a height 4 ft. 9 in. from the rail to under side of the bottom row. It is further recommended that the name of the railroad should also be placed on this end of the car over the initials and number and that the space at the right-hand end of the side of the car be reserved for the marking, showing capacity, dimensions, weight, etc." The matter was referred to the executive committee with power to appoint a special committee to give it proper consideration.

The meeting then adjourned.

SECOND DAY.

First Vice-President G. N. Dow (L. S. & M. S.) in the chair.

Arbitration Committee.—The committee at a meeting on the previous day reconsidered some of the recommendations made in the advance report distributed. These modifications, which were read by the Secretary, are as follows:

"(1). That the recommendation relating to the placing of advertisements on cars be reconsidered.

"(2). That rule No. 40 be changed to read: Damage of any kind to the body of the car due to unfair usage, derailment or accidents; also temporary advertisements tacked, glued, pasted or varnished on cars—delivering company responsible.

"(3). That the following prices be inserted in Rules 106: Removing temporary advertisements tacked on cars, per car, 50 cents. Removing temporary advertisements pasted, glued or varnished on cars, per car, one dollar."

Owing to the fact that the standard specifications for air-brake hose adopted by the association are now being subjected to a chemical analysis, and as the final determination of this analysis will not be reached until the next convention, the committee recommends that the date for final equipment of cars with M. C. B. standard hose be extended from March 1, 1908, until September 1, 1908, so that the rule will read:

"Cars equipped with air-brake hose other than M. C. B. standard hose on and after September 1, 1908, owners responsible, except cars offered in interchange, where delivering company is responsible."

In order that there may be uniformity of action in the matter of handling of cars not equipped with air-brakes just prior to the date when this rule becomes effective, the following resolution was adopted:

"That in order to comply with the requirement of the rules of interchange whereby cars in interchange will not be accepted without air-brakes after September 1, 1907, it is the opinion of the committee that loaded cars in interchange not equipped with air-brakes should not be accepted after July 20, 1907, unless homeward bound."

That the Secretary be instructed to at once issue a circular to the members calling attention to this resolution.

It was decided that the recommendation of the committee with regard to rule 37 be reconsidered, and in lieu thereof a paragraph be added as follows:

"On and after September 1, 1908, all cars not originally equipped with retaining valves, owners responsible."

It was suggested that the provisions of rule 98 regarding the correction of bills, and the use of a letter of authority for counter bill to cover acknowledged errors, conflicted with the requirement of the auditing department of certain roads and the rules of the Association of Accounting Officers. It is suggested that a committee be appointed to confer with the Association of Railroad Accounting Officers to prepare a suitable rule.

On motion the entire report with all changes and recommendations was accepted and adopted.

Triple Valve Tests.—The brief report of the committee was accepted as a report of progress without discussion.

Brake-Shoe Tests.—Following the presentation of the report by Prof. Goss, chairman of the committee, the privileges of the floor were extended to F. W. Sargent (Am. B. S. & F. Co.) to present a summarized report, covering the work of the brake-shoe committee during its life of more than 10 years, which he had prepared at the request of the committee and which was distributed as a supplement to the committee report. This supplementary report will be printed in a subsequent issue.

G. W. West (N. Y. O. & W.): I would call the attention of the association to a point raised by Mr. Sargent:

"The M. C. B. record of shoe tests, while most important and valuable, will remain incomplete until checked up by service tests. The brake-shoe testing machine records results under ideal conditions—a steady wheel moving true with a constant uniform braking load and perfect contact between shoe and wheel, with clear, dry surfaces in contact under practically uniform climatic conditions. In actual service we have the reverse, namely, an unsteady wheel pounding along over uneven track, more or less elasticity in brake-

beams and brake connections, and fluctuation in braking pressure, coupled with the varying contact between wheel and shoe with extremes of climatic conditions from cold to hot and wet to dry. The test wheel is uniform in its bearing against the shoe, and always moving in the same direction, the projections tend to bend away from the shoe and the surface of the wheel to polish up and to smooth over and afford a better contact than in the case of the wheel in service conditions. With the ordinary car wheel the unflanged brake-shoe covers that part of the wheel not in contact with the rail, as well as that part of the wheel which is in contact with the rail, so that there are two distinct surfaces under the shoe. The side motion of the brake-shoe is continually varying the amount of contact between the shoe and these two surfaces, while the inequalities of track condition and the pounding of the wheel cannot but fail to break the grip of the shoe on the wheel, all of which means that the actual coefficient of friction from the service tests is much less than that indicated in the shop test. To make the records complete, therefore, some connection should be made between machine and service tests, and to my mind this can be done without very much trouble and expense."

I think that is quite an important point, and should be taken into consideration. Such a test should be made. We have a train on our road that gives us ideal conditions, as far as load tests are concerned, and we shall be glad to conduct it on a milk train we have, which makes 200 stops in 250 or 300 miles.

Secretary Taylor: Inasmuch as Mr. Sargent has made some recommendations concerning the brake-shoe tests of the future, his recommendations should be referred to the Executive Committee in connection with the recommendation of Mr. West, so that in formulating a programme for next year the Executive Committee can make up the committee.

A motion to submit such a recommendation to the Executive Committee was carried.

Tests of M. C. B. Couplers.—In the absence of the chairman of the committee, R. L. Kleine (Penna.) presented the report.

F. W. Brazier (N. Y. C.): We averaged during the last 30 days, or up to the time that I came to the convention, 2,492 broken couplers on the New York Central. That shows that we are not paying attention enough to the recommended practices of this association. One of the most important matters relative to purchasing material is that the parts that are bought for the different couplers should be like the original parts. The tendency to buy repair parts from outside foundries on account of their being a little cheaper has made considerable trouble.

I recently saw a large number of repair parts bought for a certain make of coupler which, had they been applied to the couplers, would have made them inoperative; and the only way to maintain couplers is to know that the repair parts are purchased from reliable parties and are exact duplicates in size and quality of material of the original. We cannot be too particular to get nothing but the best of material for knuckles, and I am of the opinion that a drop forge knuckle, even if it costs more, would be a move in the right direction.

R. P. C. Sanderson (S. A. L.): I make a motion that the recommendations of this committee be submitted to the Committee on Standards to be taken into consideration with a view to making them definite recommendations in regard to the standards next year. In doing so, however, I would like to call attention to recommendation No. 1. I think the recommendation is too accurate. I do not believe a precise center line is absolutely necessary. I believe a little latitude, as long as the lift is approximately in the central position, will be all right.

Recommendation No. 10 I also question. It would be all right for the common slab form of follower, but if it were made mandatory it would shut out all draft gears which are arranged so that the follower is a part of something else and has a combined function to perform.

J. J. Hennessey (C. M. & St. P.): I question the judgment of having $2\frac{1}{2}$ in. on any coupling device at any time between the horn of the coupler and the face plate. I was called out on the repair track the day before I left. I found two steel cars there with the center sills bulged out. In one case the rivets were pulled through the rear draw lugs. The cause of that was that the full movement of the coupler had been taken up before the horn of the coupler gave any relief to the buffing shock. If the horn of the coupler had struck the striking plate we might have broken the horn of the coupler, but it would not have been as expensive as having to remove the center sills and straighten them on those two cars.

Another thing. I am inclined to believe $2\frac{1}{2}$ in. of side clearance is excessive. This gives relief to the end of the car, the draft timbers and center sills, but every pound that you relieve the draft timbers and center sills of you are putting on to the flanges of the wheels. The flange of the wheel is the weakest part of the car structure.

C. A. Schroyer (C. & N.W.): The amount of backward and forward motion of drawbar considerably affects the trouble we are having to-day with broken links and clevises of our uncoupling

apparatus. The bent uncoupling rod also is due largely to that.

We are having an infinite amount of trouble on our line because of the chains and clevises being broken by having freight cars coupled to passenger cars and having the buffer of the passenger cars strike the uncoupling rod and breaking these chains and clevises. It would be an excellent idea to have a committee to investigate these questions and to report to this association on the use of a standard uncoupling apparatus, whereby these difficulties could be avoided. The use of any uncoupling apparatus that will do away with the trouble we are having under those conditions would be an excellent thing for us to have.

W. McIntosh (C. R. R. of N. J.): The trouble that Mr. Hennessey anticipates that would result from liberal clearance on either side of the drawbar I do not think would be realized. We have been operating some cars for the past two years with a total clearance of 3 in. very satisfactorily. We have considered that this additional clearance has a rather favorable effect on the flanges of the wheels, instead of an unfavorable effect, for the reason that it relieves the flanges from rail pressure that would be brought against them, providing the clearance for couplers is limited.

T. H. Russum (B. & O.): The time will come, if it is not here now, when we must have more lateral movement for our couplers. When on a curve the trainman cannot uncouple a car from the fact that the coupler is gripped so tightly by the binding he is forced to move the train to uncouple. On our large journal axles the collars are wearing more rapidly than the journal reduces in diameter, and in a short time we will be scrapping axles, due to the wear of the collar on the journal. If there is more lateral movement in our couplers, that will be reduced; also, the wheel flange will be considerably helped by more lateral movement of the coupler.

R. L. Kleine: In regard to the additional side motion, the committee recommended "not less than $2\frac{1}{2}$ in. This seems to be about the maximum side clearance at which couplers will mate. If you get more than $2\frac{1}{2}$ in. side clearance, and the car is somewhat off center, then the point of the knuckle will strike on the guard-arm. With an increased side limit it will be necessary to bring the coupler back to the central position of the car, and we will have to guard against that. In regard to the motion of the draft gear, $1\frac{3}{4}$ in. for spring and $2\frac{3}{4}$ in. for friction, the committee does not feel that the best place to overcome the shock is on the horn of the coupler, not for the reason that you could not strengthen the horn of the coupler to withstand that shock, but for the more vital reason that the buff and pull should be in the central, longitudinal plane of the car.

Mr. Sanderson: In reference to the matter of clearance between the coupler shank and the carrier iron or sills. I made some very thorough tests some years ago to see what the lateral pressures would be under curving of cars, the angling of couplers, under rough ordinary conditions, and found, as I remember, lateral pressures exceeding 20,000 lbs. would have to be taken by the pressure of the flanges against the rails. As a result, we increased the clearance to $1\frac{1}{4}$ in. a side, or $2\frac{1}{2}$ in. total, which this committee now recommends, which practice I have been following for some time. I have every reason to believe that the effect on the flanges of the wheels has been beneficial. I did not find that if we got beyond that that we encountered the difficulties which the committee has mentioned in coupling cars.

F. F. Gaines (C. of Ga.): In regard to recommendation 1, with the explanation which has been made as to the intent of the paragraph, I suggest that the committee so word it that it is understood not to eliminate the consideration of other forms of uncoupling devices.

John J. Tatum (B. & O.): We have in the last three years arranged something like 15,000 cars with about $2\frac{1}{4}$ in. side clearance to the couplers, and we have got excellent results from that additional movement.

W. E. Symons: I think the committee suggested by Mr. Schroyer should be appointed, and they should co-operate with the committee on draft gear, to the end that all objectionable features mentioned by the members and by Mr. Moseley should be eliminated in future coupler construction and locking arrangements.

Mr. Schroyer: I move the appointment of a committee to co-operate with the committee on couplers relative to use of an unlocking apparatus that will do away with chains and will eliminate the difficulty now occasioned by the breaking of chains at clevises in the coupling and uncoupling of our equipment. My attention has recently been called to a device that will do it, and one of the most important railroads in the country is using it. It is a patented device, and while this association cannot recommend the adoption of a patented device as a standard, it can let it be known that there is a device which will accomplish the ends we are aiming at.

W. McIntosh: While it would be desirable to eliminate the use of chains in this connection, we might go from the chain to some other connection that would be fully as bad or worse. I think the motion should be modified to embrace an uncoupling device of the simplest and most effective form. There is some good apparatus now in use, and it would hardly seem fair to condemn the use of

chains when you are not prepared to advance a substitute that is superior.

Mr. Symons: It is my understanding Mr. Schroyer's motion specified a certain difficulty to be removed which we now have in the use of certain uncoupling devices, regardless of the method used or employed in applying the remedy.

The motion thus amended was adopted.

Rules for Loading Long Material.—On motion, the recommendations of the committee were allowed to prevail and will go to letter ballot in regular form for adoption as a standard.

Cast Iron Wheels.—Wm. Garstang, chairman of the committee, presented the report, following which he read a communication from J. E. Muhlfeld (B. & O.), a member of the committee who dissented from the views of the majority of the committee, and another from the committee of the wheel-makers.

Mr. Muhlfeld said: I would not care to approve the committee's report, as I understand it has been prepared. Therefore, as a matter of record will you kindly note the following exceptions:

(1). From our experience, chills made the same as the profile of a 1-in. 20-taper wheel will not produce wheels of the same taper.

(2). Taking wheels of nominal diameter for test purposes would not eliminate the hard-iron wheels.

(3). Leaving out the 2 per cent. variation clause makes no limit to the maximum weight when purchased on the pound basis.

(4). To reduce the liability for derailment of new wheels that may come in contact with worn or sheared rail we do not consider it advisable that the radius at the throat of the flange shall be more than $\frac{3}{8}$ in.

(5). We consider that cast-iron wheels under cars of less than 80,000 lbs. capacity having flanges 1 in. thick and wheels under cars of 80,000 lbs. and over capacity having flanges $1\frac{1}{16}$ in. thick are safe to run.

(6). Our opinion is that the conclusions should state that the new standard shall be accepted as the minimum limit of the wheel to be used.

The wheel-makers' committee said in part: As to the designation "for 33-in. cast-iron wheels, having minimum weights of 600, 650 and 700 lbs. for cars of 60,000, 80,000 and 100,000 lbs. capacity" wheels made according to the design and section adopted in 1905 by the M. C. B. Association, with the proposed increase of thickness of flange and tread, cannot be made without adding about 15 lbs. to the weight of wheel, unless the thickness of section is decreased elsewhere, and would ask to have the weights for 33 in. wheels as above designated as 615 lbs., 665 lbs. and 715 lbs., with the usual allowance of 2 per cent. for variation and weights. Such variation is inevitable and should be provided for to avoid misunderstandings as to the weight of wheel to be furnished. * * * We would urge that the subject of wheel service generally be given farther attention with particular reference to the matter of wheels removed from service for causes beyond the control of the manufacturer—i. e., sharp flanges when wheels are sufficiently chilled, shelling out and brake burning, due to excessive brake application, flat or shelled out spots occurring opposite each other on the same axle. Considering the heavy increase in loads carried, car mileage and general conditions of the service, wheel removals for these causes are rapidly increasing and the necessity of proper action with regard to claims made against wheel-makers is of vital importance.

President Fowler: Unless there are objections, the report will be considered as received and open for discussion.

John J. Tatum (B. & O.): The gage for the limit of wear on the flange has been changed, limiting the wear of flanges on 100,000 lbs. capacity cars to $1\frac{1}{8}$ in.; on 80,000-lb. cars to $1\frac{1}{16}$ in., 1 in. remaining for the 60,000-lb. cars. I am of the opinion that the inch limit should apply to the 80,000-lb. car and the $1\frac{1}{16}$ in. to the 100,000-lb. car. Otherwise the mileage will be very much reduced, and I do not see that the factor of safety will be very much increased. If you check up the number of wheel flanges that have been broken the number will probably be greater with the full flange than those having the worn flanges that would be detected by this gage. It would be very interesting if we could have a table showing the flanges of wheels that have broken, giving the sizes of flanges, so that a comparison could be made showing the reason for limiting the wheel flange wear $1\frac{1}{8}$ in. in place of $1\frac{1}{16}$ in., and why we should have gone to $1\frac{1}{16}$ in. on the 80,000-lb. cars in place of 1 in.

R. L. Kleine (Pa.): Our experience is that the wheel flanges which fall below $1\frac{1}{8}$ in., due to breakage on 100,000-lb. cars, is about 50 to 60 per cent., showing that if the limit should be increased from $1\frac{1}{16}$ in. to $1\frac{1}{8}$ in., we just save that many broken wheel flanges, and it is of vital importance, because every one of them causes an accident.

The committee has gone a little further on the safe side than probably we should go at this time, in that they have made the radius at the fillet or throat of the wheel $\frac{3}{8}$ in. instead of $\frac{3}{16}$ in., our present standard. We had a gage made according to the committee's report and gaged up a number of worn wheels under cars. We found that it depends altogether on how the flange wears. In some cases the new gage of $\frac{3}{8}$ in. at $1\frac{1}{16}$ in. would condemn the same wheel that the old gage, with the $\frac{3}{16}$ -in. radius, condemned at $1\frac{1}{8}$

in.; but that is only under certain conditions, and I would move that the gage which the committee recommends be adopted with the radius changed from $\frac{3}{8}$ in. to $\frac{3}{16}$ in.

W. F. Bentley (B. & O.): The B. & O. has been for some time having all cases of broken flanges looked into very carefully. There have been very few broken, due to being below the $1\frac{1}{8}$ -in. thickness, unless it has been due to a seam in the throat of the flange. That is the trouble we are having with our cast-iron wheels to-day, the seam in the throat of the flange. There is a very large percentage of the flanges breaking off that are above the $1\frac{1}{16}$ -in. limit, and we find the cause is the same in the throat and not the flange being worn below the amount specified.

A. W. Gibbs (Penn.): We were very much alarmed by the tremendous increase in the number of failed flanges from all causes, and more particularly on the 100,000-lb. cars. In 1904 we voluntarily increased our thickness to $1\frac{1}{8}$ in., which was above the M. C. B. limit. In 1903 we began putting in the coned tread. From 1902 to 1905 the failed flanges were on a continual increase and it was very alarming to us. It eased a little in 1905, and I am glad to say that notwithstanding the increase of the number of wheels under 100,000 lbs. capacity cars since then, 1905 was the high-water mark; 1906 showed a decided recession in the total number, and so far 1907 has borne that out. Something has caused that—I do not think it is any one cause—perhaps both the coned tread and the increase of thickness have contributed.

As for this increase in thickness, there is a very good reason to believe that the peening action on the rail spreads the surface and wedges the flange off, so that the flange breaks, not because it is thin, but because during its long course of wear there has been so much peening on that point that it cracks; so that the thin flange is the measure of the amount of peening that the rail has received. While I will not say that any one of those causes produced the result, we certainly should have expected an enormous increase, considering we have been adding nothing but 100,000 lbs. capacity cars to the equipment. The cost of renewal of wheels has become very large. No doubt the thickness prescribed has had an influence, but we think it is wiser to spend the money on new wheels.

J. J. Tatum (B. & O.): When our inspector detects a seam in the throat of the flange of a wheel, the wheel is removed and the flange broken off and sent into the office. We can see just what the thickness of the flange was, and whether it had worn materially. We found in a number of cases that the flanges were practically full size, yet that seam is in the throat of the flange. The gage, as it has been limited for the wear of the flange, would not detect that.

F. F. Gaines: While probably 90 per cent. of our broken flanges are with full flanges, occasionally we have a broken flange that is thin. One wreck will cost more than the decreasing of the limit, and I agree with the committee that we should adopt a stronger standard on that throat.

W. G. Menzel (Wis. Cent.): We have found invariably with broken flanges that the flanges exceed the gage. Also that the break was probably due to the shape into which the flange wore, and that it is principally governed by the vertical height. We concluded that the thickness of the flange did not cut as much figure as the vertical height of the wear. I believe the rules should be so changed that they would cover the shape of the flange more than the thickness or the vertical height.

Mr. Sanderson: I would ask the committee whether any consideration has been given in the last year's work to the question of a further increase in the radius of the throat of the flange. I believe that a good many railroads have gone further than the $1\frac{1}{16}$ -in. throat, and I think the results have been beneficial.

Mr. Garstang: I think the committee has gone about as far as it can on the thickness of the flange. It took us quite a good while to get our superior officers to let us put on the $\frac{3}{8}$ in., and I feel that is as far as we will be able to go. In regard to the radius of the throat, there has been nothing contemplated by the committee. We found that there are a great many wheels running on some prominent roads with a $\frac{3}{8}$ -in. radius, but the committee felt that the $1\frac{1}{16}$ in. would better meet the requirements.

W. E. Symons: The association should be actuated by a spirit of liberality toward the wheel-makers, not only, in the manufacture of wheels, from a purely engineering standpoint, but from a financial standpoint. It is not many years ago that in my own experience I found we were using a wheel weighing 600 lbs., and we were buying it for \$6. I do not understand how any one can invest in a plant and make wheels for a price less than the cost of the pig iron, which was \$20 a ton at that time. The recommendations and suggestions of the Wheel Makers' Association should have full consideration, and in so far as possible should be complied with.

A. W. Gibbs: Mr. Symons is right, because we should bear in mind that the section of the rail is in a transitory condition. I do not think this is an opportune time to ask the committee to put in something new which might tie them up in connection with the rail committee.

Mr. Symons: I move the report of the committee be adopted and referred to letter ballot.

C. A. Soley (R. I.): I suggest that new wheels be given an arbitrary symbol by which they can be noted in comparison with old wheels, and that the committee add to their recommendations a symbol designating a new wheel.

Mr. Garstang: I accept that.

R. L. Kleine (Penna.): I would take an exception to paragraph 4, to the words "wheels of normal diameter." The inspector should have a choice of taking any wheel at random, instead of being limited to a wheel of normal diameter. I move that the words "normal diameter" be stricken out and the sentence read "representative wheels shall be taken at random."

Mr. Soley: Regarding the matter of weights as referred to in the communication of the wheel makers: While we want to pay for everything we get, I suggest that the use of the present weights, 600, 650 and 700 lbs., are but arbitrary measurements and that the committee make a suggestion to the wheel makers that they revise their core and hub measurements, so as to take the 15 lbs. out if necessary, to agree with the standard.

Mr. Symons: I accept Mr. Kleine's amendment.

Mr. Gaines: I move an amendment, that instead of taking the excess weight, due to the increased flange, from the weight of the wheel, that we have a maximum and minimum to be decided upon.

Mr. Garstang: Your committee found the weights recommended were best suited for the different classes of cars they are going to be used under. The question of the maximum weight is a local one, and is generally decided upon between the purchasing agent and the wheel manufacturer.

The motion of Mr. Symons was carried.

Air-Brake Hose Specifications.—This committee, as well as the special committee on Chemical Analysis of Air-Brake Hose, submitted a progress report and both were continued for another year.

THIRD DAY.

High-Speed Brakes.—F. M. Gilbert (N. Y. C.) presented the report and called attention to an error in the report as printed. On the sixth line from the end of the report it should read 28,000 lbs. instead of 22,000 lbs. The report was received and referred to letter ballot.

Height of Brake Staff.—The Secretary read the report.

C. A. Soley (C. R. I. & P.): I would suggest that if this matter goes to letter ballot, the last portion, relating to the distance from center, be eliminated, as being already covered in the standards for protection of trainmen.

C. A. Schroyer (C. & N.W.): To limit the height of brake staff to 14 ft. is going to interfere with many of our cars. On the standard cars recommended by the American Railway Association, we have 4 ft. from the track to the top of the floor. We have 8 ft. from the floor to the underside of the carlines, and some have a 12-in. car line, 2-in. roof and 4-in. running board, or a total height of the car about 13 ft. 6 in. With 6 in. above the height of the running board you have to get down pretty low. There has not been a sufficient amount of investigation to justify the recommendation of any special maximum height of this brake staff. Our furniture cars are 9 ft. high in the clear.

J. W. Marden (B. & M.): The standard height of brake staff on the Boston & Maine system is 14 ft. 6 in.

H. L. Trimyer (N. Y., N. H. & H.): The clearance line for the New Haven road is 14 ft. 3½ in. from the top of the rail.

The suggestion made by Mr. Soley was put in the form of a motion and adopted.

Automatic Connectors.—This committee did not send in any report.

Tank Cars.—C. M. Bloxham (Union Tank Line) read the report. There is one important change in the specification for testing the tanks, extending the period from five years to ten years. Another provision is that every tank shall be inspected by some railroad, and preferably by the railroad on which the car is at home, and if it meets the specifications, it shall be stencilled across the head of the tank so that the car can move freely on the different divisions of that road or any connecting road. If it is properly stencilled, the time of the inspectors will not be taken in going over the car carefully to see that it is in accordance with the specification.

One of the objections to stencilling the maximum capacity in pounds on tank cars is that it would be entirely misleading. Suppose, for example, a 10,000 gallon car is stencilled capacity 80,000 lbs. When the railroads bill this car loaded with oil they bill it at the actual average weight used for petroleum and its products, viz., 6.4, or 64,000 lbs., while the car may contain light or heavy products the actual weight of which would run from 52,000 to 72,000 lbs. Liquid freight is sold per gallon, the price often running to three decimal points. The traffic department of the railroads recognizing the necessity of a clear and definite per gallon basis as between the seller and the buyer have fixed actual weights per gallon for all liquid freight. The freight charges in all cases are computed at the maximum capacity in gallons on each tank. Now if the capacity of these cars in pounds is stencilled thereon it leads to endless confusion caused by delivering agents setting up the freight charges on their waybills to the maximum capacity in pounds. Railroad

tariffs filled with the Interstate Commerce Commission and published all over the country show definite fixed actual weights for all kinds of liquid freight, and the traffic departments of these railroads understand the impossibility of handling liquid freight at so-called actual weights obtained by weighing on railroad scales without causing great confusion, annoyance and loss as between the producer and the consumer. As there is nothing to be gained by the railroad in inaugurating any plan for handling liquid freight at scale weights, and as they are now getting freight revenue on the maximum cubic capacity of every tank car at a weight per gallon established by the railroads themselves there seems to be no reason for injecting in this well-established commercial and railroad situation the question of the maximum capacity of tank cars in pounds. As the case stands to-day the railroads in the end get the actual weight on every gallon of liquid freight shipped in the United States. If they do not get it in one car they do in another, and they are saving the enormous expense of cutting out such cars and weighing them on track scales both light and loaded. The shipper of liquid freight furnishes the car and the railroads bill it at the maximum cubic capacity at the weights they themselves establish. There is no class of traffic in the United States to-day on which the railroads assess their freight charges so closely on an actual weight basis as they do on liquid freight, and it would be a great hardship, loss and annoyance to all concerned if this well-established, fair and equitable plan of handling liquid freight is interfered with.

These same objections apply to the plan of stencilling tare weights on the car as it would surely bring about in the end the same complications as would arise from stencilling the gross weights on the car.

The weight carrying capacity of all of the Union Tank Line equipment is considerably in excess of the actual load put in these cars. Take, for instance, U. T. L. car No. 4,209, with a cubic capacity of 6,001 gallons. The tank at 6.4 lbs. to the gallon, which is the average weight applied to petroleum products, has a weight capacity of 38,406 lbs., and it is on this weight that all freight charges should be and are collected. The actual weight that is loaded in this car with petroleum products would vary from 5½ lbs. on naphtha, or 31,505 lbs., to 7½ lbs. on lubricating oil, or 45,007 lbs. The actual weight carrying capacity of this car is at least 50,000 lbs.; in other words, we can load this car to its full tank capacity with a product weighing 8½ lbs. to the gallon, and if we complied with rule 23 we should stencil on the tank, capacity 50,000 lbs. The result of this would be, that as all oil tariffs call for the minimum weight on tank cars to be their maximum capacity, if the car was billed out (as we would be correct in doing at 38,406 lbs.), railroad inspectors and other employees, seeing on the car the stencilled weight of 50,000 lbs., would in many cases correct the billing capacity to the maximum weight carrying capacity. This would result in overcharges, claims and endless confusion to all concerned. The U. T. L. Co. has no cars which cannot be loaded with the heaviest product, and still be under the weight carrying capacity of such car. The railroads all have handbooks showing the actual cubic capacity of every U. T. L. car and its equivalent weight capacity, based on 6.4 lbs. These cars are seldom, if ever, loaded with other than petroleum products, but when they are leased for other purposes, we stipulate the maximum weight that can be loaded in the cars.

There has been action taken on this matter by the Association of Transportation and Car Accounting Officers, and I wish to add to what I have said a resolution passed by that Association in June, 1904, as follows:

"Resolved, That the Secretary be instructed to incorporate the information which has been presented to the committee on the subject of marking tare weight on tank cars as part of the permanent records of this committee; and, furthermore, that the Secretary be instructed to insert a note in the minutes of the Washington proceedings to the effect that the Executive Committee have considered this subject and have obtained data bearing on it from railroads and from tank car owners, and they are satisfied that it is not necessary to stencil the tare weight on tank cars; also to the effect that the subject was effectually disposed of by the International Association of Car Accountants at their New Orleans meeting February 23 and 24, 1897, and by the Central and Western Association of Car Service Officers at Saratoga June 19, 1899, and to call attention to the fact that the tare weight will be cheerfully furnished by tank car owners at any time."

I have stated as clearly as I could the side of the matter from the traffic standpoint. If there are good reasons why the tank cars should carry the stencil of tare weight and capacity weight, the same as other cars, then this association should take the responsibility of taking action specifically on that point, so that every one will know why it is done; if, on the other hand, the reasons I suggest appeal to you as reasonable and fair, then it seems to me that the association should take action and provide for the omission of stenciling on these cars by putting into rule 23 of the Rules for Interchange these two words "except tank cars."

D. F. Crawford (Penn. Co.): It is necessary for us to have on the tank car a marking which will give our inspectors the opportu-

nity of determining whether the axles under the cars are of proper capacity, in the interest of safety and of transportation. I do not think the contents capacity means very much, but I do believe that it is necessary to stencil on the car the maximum weight of the car and lading. This would give our inspectors necessary information to determine the proper size of the axle, and at the same time would not interfere with the points brought up by Mr. Bloxham.

R. P. C. Sanderson (S. A. L.): Is there not also need of stenciling the light-weight and capacity so that the ordinary tonnage rating for train service and yard service can be readily obtained.

J. J. Tatum (B. & O.): We cannot afford to do other than stencil a car with the maximum capacity and tare weight, for the reason that we want to facilitate the prompt movement of our cars, and we must assist the inspector and give him the information on a car by which he can render his decision promptly.

A motion that the recommendation of the committee be accepted and referred to letter ballot, eliminating the capacity of the cars, was carried.

Stresses to which Wheels under 100,000 lbs. Capacity Cars are Subjected.—The report was presented by J. F. Walsh (C. & O.)

George L. Fowler: I have been at work on this problem for about a year and a half. I have designed a dynamometer to be put in the track which has been submitted to the engineering department of the Pennsylvania Lines West and approved. A piece of track on the Hickory branch, near Pittsburg, has been placed at my disposal, and the instrument is now about ready to go into the track. I expect to have it there within the next two or three weeks. The main difficulty has been in getting a registering apparatus that would be sensitive enough to work with extreme rapidity and at high pressure. The calculations show that on some locomotives the stresses run from 6,000 to 10,000 lbs., but I made my apparatus strong enough to carry 40,000 lbs., with an ample factor of safety. I only want to get the upper registration; the lower registration of the pressures I have no interest in whatever. My intention is to key the instrument up pretty close to the upper margin at all times with a permanent stress and then simply register the difference between the permanent stress and what is actually put on the rail. The apparatus consists of a floating piece of rail in the track, which is perfectly free to move out. It cannot move in, and its ultimate limit of movement will be restricted to a very small amount, something less than $\frac{1}{10}$ in. The actual movement will probably be less than one thousandth of an inch, so that the rails are practically stationary. The tests will be made on freight roads where there are no passenger trains. After that I expect to go on to the New York Central, where a piece of track has been placed at my disposal, and make a further investigation. I have, of course, an exceedingly short interval of time in which to make these measurements. A freight car running 40 miles an hour gives about one-twentieth of a second in which to make a record and get ready for the next one, and the paper will have to travel pretty rapidly. The apparatus, which has been designed, can readily register down to one-fiftieth and one-seventy-fifth part of a second.

The report of the committee was accepted and the committee discharged. Mr. Fowler was asked to present an individual paper on the subject at the next meeting.

Clearances for Electrical Equipment.—The Secretary read a letter from J. F. Deems (N. Y. C.):

"This matter is now in the hands of a committee of the American Railway Association, * * * and included in this committee are practically all the members who were formerly on the Master Car Builders' Committee. No report will be made at the coming convention from the Master Car Builders' Committee."

Subjects.—W. E. Symons presented the report. He said in explanation: The second subject (Side Bearings) contemplates a thorough analysis of the question of the best form, type and proper location of center plates and side bearings. We do not contemplate any change in the location of the center plate, but there is a diversity of opinion as to the proper location of side bearings, their distance from the center plate and the amount of vertical clearance. The study of the behavior of cars when rounding curves and the relation of the center and side bearings to possible causes of derailment will require a thorough analysis of the influence which the steel car body has on the structure when rounding curves and in general service conditions. The report was accepted and referred to the executive committee for action.

J. W. Marden (B. & M.) was given the privilege of the floor and made a short address to the association on the value of maintaining standards. He said in part:

Our standards ought to be kept up to the highest degree of efficiency and reliability possible. I have taken great pride in learning that they are considered throughout the United States and Canada, and in foreign countries as well, as standards to be recognized as such and to be quoted as authority, and I want to impress upon the younger members particularly the importance of carefully considering all of the subjects that are brought before this meeting for a personal vote at your respective offices.

The rules of interchange have the same importance, and while they are not safeguarded in just the same way, by a letter ballot

of the association, yet in voting on the Rules of Interchange and in discussing those rules sufficient time and deliberation should be taken to make them as effective as possible.

Just before I came to the convention one of my foremen said he found an M. C. B. standard journal bearing that would not go into an M. C. B. standard oil box. I find that the lines of our standards are not as rigidly followed as they should be, and I want to impress that upon your mind, that after we vote for a standard and make a standard, that we should follow it.

The officers elected for the coming year are: President, G. N. Dow (L. S. & M. S.); First Vice-President, R. F. McKenna (D., L. & W.); Second Vice-President, R. W. Burnett (C. P.); Third Vice-President, T. M. Ramsdell (C. & O.); members of the Executive Committee, D. F. Crawford (P. L. W.), T. H. Curtis (L. & N.) and F. H. Clark (C. B. & Q.).

Topical Discussions.

UP-TO-DATE CLEANING OF PASSENGER EQUIPMENT.

P. H. Peck (C. & W. I.): On the terminal road with which I am connected from 6,000 to 7,000 cars per month are cleaned. Our coach cleaning yard is elevated and holds about 350 cars. Our force consists of a general foreman, a foreman for each yard (north and south), a night foreman and about 130 men all told. The entire force is paid by the day. The power house is in the north yard and furnishes steam, air and electricity for the entire yard. The pipes and wires are carried in a conduit 5 ft. square, so that in case of derangement they are easily accessible. A Bowser oil storage system is installed at the center of the yard, and we have pumps 400 ft. each way from the center of each sub-yard, which avoids carrying oil any great distance.

From what I have observed and been told, I am led to believe that the vacuum system is not as well adapted for the floors and carpets of cars as the compressed air system, but for seats and draperies the vacuum is probably preferable. In order, therefore, that really up-to-date cleaning of cars can be obtained, a yard should be equipped with both systems, because cars could be cleaned better and in less time.

For the proper cleaning of cars the carpets should first be removed to permit a thorough cleaning of all corners and under pipes, etc., in the car. While the carpets are removed and being cleaned the floor of the car should be thoroughly cleaned by compressed air and then scrubbed. The carpets should be replaced and the vacuum system used to clean the seats, draperies and other parts of the car.

Coach cleaning may be divided into three parts:

(1.) *Inside Cleaning.*—This is for sanitary purposes and for the health and comfort of the passengers.

(2.) *Outside Cleaning.*—This is for outside appearances and to preserve the paint and varnish. For this purpose nearly all roads use some kind of a cleaner; some buy it, others make it themselves. Personally I believe a good cleaner is beneficial to the varnish.

(3.) *Trucks and Under Rigging.*—I visited all the coach terminals in Chicago and find that trucks are wiped chiefly by the use of a brush and a bucket of oil. This makes the trucks look very fine before a train leaves the station, and also has a tendency to prevent the springs and bolts from rusting, but after the car has run a few miles in dusty weather, the trucks bear very little evidence of ever having been cleaned.

The road with which I am connected does the cleaning of passenger equipment in Chicago for the Wabash, Monon, Erie and Grand Trunk roads besides our own equipment. I have some figures showing the average cost of cleaning the different kinds of passenger equipment cars.

Sleeping car	\$1.96
Suburban coach	.32
Coach with oil lamps and closets	.26%
50-ft. baggage car	.22
50-ft. combination mail and baggage	.27
60-ft. mail car	.47
60-ft. baggage car	.32
Wide vestibule coach	1.29
Combination coach and baggage	.63
Wide vestibule chair car	1.48
Platform coach	.48
Dining car	1.85
Parlor car	.76

During the year 1906 we cleaned 89,026 passenger equipment cars at an average cost per car of 77.8 cents.

President Fowler: Mr. Peck probably has charge of the largest car cleaning establishment on the continent, so that the information we get from him is extremely valuable.

Wm. McIntosh (C. R. R. of N. J.): The road I am connected with has a vacuum system installed in the passenger cleaning yards at Jersey City. It has been in operation for about two years and is doing satisfactory work, especially with the upholstering and interior trimming. We are so well satisfied with it that we consider it indispensable to a well-equipped passenger car cleaning yard.

F. W. Brazier (N. Y. C.): We do a great deal of what we term "E" cleaning. We give our cars an "E" cleaning once in every three months if they require it. Then we try to keep water off our cars as much as we can; we believe that the dry wiping main-

tains a better surface on the car, and that the longer you keep water off the better off you are. We use on our limited trains what we call "thinner oil," very thin, wiped down so as to make you think when you get on the car that you are in a new train.

B. Julien (U. P.): On the Union Pacific, prior to two years ago, we used the straight air. Since that time we have been using the vacuum system, something that we fixed up ourselves. The vacuum system is better for the plush; it does not strain it as much as the straight air does, and we have better results all around. Also, it is a cheaper system of cleaning than the straight air, as there is not so much wiping to do afterward.

C. A. Schroyer (C. & N.W.): We clean about 400 cars a day in Chicago. We have one yard fitted up in what we consider a modern manner, with steam, air and water. We use straight air for blowing out the dust upon the varnish and in the blinds and curtains, blowing it out of the cushions and backs. I have thought that I would like to have the vacuum system, but we cannot have it in our yard unless we use it in connection with the straight air system, and we think that that costs too much money, because straight air is pretty expensive. I have also thought that it would be wise to use the vacuum system in connection with steam, running steam pipes out into the yard and producing the vacuum. Both of those methods are now in use, but I think a better one would be to have a little exhaust fan run by a motor and take that right along from car to car, running a wire down from an electric line for power.

President Fowler: The lack of facilities, poor yards, etc., is a point that ought to be brought to the notice of the parties responsible. It is impossible for those in charge of car cleaning to get good work done unless the cars are set where the conveniences are located.

W. E. Symons: I ask what character of cleaning Mr. Peck's figures referred to. If in the sleeping cars it covered the sleeping car equipment and also the outside of the coach body, and if so, the quality of cleaning material used on the outside of the car.

Mr. Peck: The figures I gave were the general average for all cars. Some roads run fine trains and are very particular about dust and thorough cleaning. Other roads run a great many common cars—express cars and so on—and they do not cost so much.

Mr. Symons: Does the average include sleepers?

Mr. Peck: No. The Pullman Co. tends to its own cleaning, with the exception of the Grand Trunk, which does all the inside cleaning of Pullmans, and we the outside.

Mr. Schroyer: On the North-Western it is costing around \$8.75 to clean a sleeping car.

R. F. McKenna (D. L. & W.): Where the terminal is of sufficient size to warrant it, there should be a shed capable of holding a number of cars in proportion to the equipment handled at that point, and at stated periods, whatever may be deemed necessary according to the service, the cars should be taken out of service and given what might be termed a light shopping; that is, giving them a thorough exterior cleaning with an emulsion of some character, and having the interior finish rubbed down with polish. At the same time, it permits of painting the trucks and platforms and gives a tone to the car which keeps it in good condition up to the time of its next shopping.

J. W. Marden (B. & M.): I should like to know whether the car cleaning is done entirely by day-work or by piece-work; and if piece-work, what success has been attained?

Mr. Peck: Ours is entirely day-work. There is some piece-work in Chicago, and I find they have less men, but the less number of men draw as much pay as the larger number of men in day-work.

PASSENGER CAR VENTILATION.

W. McIntosh (C. R. R. of N. J.): There have been but few thoroughly scientific schemes of car heating and ventilation worked out to a finish, and it is doubtful, all things considered, if these ever produced results that would justify the elaborate efforts and accompanying expense involved in the attempt. The aim naturally is to provide ways and means of introducing into the car, in the most direct manner, sufficient air to replace the vitiated air that rapidly accumulates in a compartment with many occupants. This air should be heated so that by the time it reaches the travelers it will be raised to a reasonably comfortable temperature, and in order that this operation may be continuous, means must be provided to exhaust, in some manner, as much air from the compartment as is being forced in at some other point. Economy and convenience leads to the adoption of the movement of the car through space to impound and direct the required volume of air into the car, in some instances passing it over a nest of heated pipes to raise the temperature from outside conditions to what is required inside. In other cases no concentration of this kind is attempted, but the air is directed into the car and an endeavor made to train the currents in such a manner that a thorough mixing of the heated air inside and the cooler air entering takes place, and, in continuation of this movement, a proportion of the part that has become vitiated is endeavored to exhaust. In just such a degree that this is accomplished will the results prove satisfactory. It will necessarily require some very fine apparatus and some thoroughly worked out

theories to accomplish this accurately. It, however, seems unnecessary to reach any such degree of refinement, but, on the contrary, some very simple appliances serve to accomplish such commingling, circulating and ejection, and well within the limitations allowed. And not only is it possible, where careful attention is given to the proper adjustment of such appliances, to admit a liberal supply of fresh air, warm it comfortably, and distribute it throughout the car so that each passenger will obtain his allowance, but, in turn, the foul air will be gathered up and moved out, and all be done without any inconvenience and without attracting the attention of the ordinary traveler. When it is possible to secure such fairly satisfactory results in such a simple and reliable manner, it hardly seems necessary or justifiable to try more elaborate and costly methods.

A moving railroad passenger car affords in action the necessary functions to bring about ideal ventilation. If the natural forces at hand could be properly directed, this would be about as follows: Suitable openings or hoods would have to be provided at the end of the car, in the direction in which it is moving, to guide the air into a system of heated piping under the hood, the pressure engendered by the moving car forcing the air through suitable ducts extending over the interior of the car, toward the rear, with branches directed downward toward the seated passengers, the exhaust taking place through suitable openings in the floor, and produced by the vacuum developed under the moving train as it is driven along. It would not be possible to furnish very complete ventilation in this manner unless runs were continuous for a considerable distance and proper mechanical arrangements were made to close the floor ducts and open the hood ventilators when the train stops. All systems are deficient here, ventilation ceasing when motion stops, and it is only by some independent forced system of ventilation that proper circulation of air can be kept up while the cars are standing. That some method will yet be evolved for a forced system of ventilation, controlled by independent motors, is quite possible, but it will necessarily be complicated and expensive.

G. E. Carson (Penna.): We have a system we have had in use for a number of years, and we are very well satisfied with it. The only trouble is that it does not ventilate a car when it is standing still.

C. A. Schroyer: We have on our passenger cars a ventilator that comprises a jack located on the roof of the car practically of the same shape as the old Spear jack. The forward motion of the car scoops the air into this jack, and by means of a pipe connecting the jack with the radiator, having 60 or 70 sq. ft. of radiating surface, which is located directly inside the end doors of the cars, we force air through this pipe down into the body of the radiator, where it is heated during the winter season. This does in a very marked manner change the air in a car under the speed of the train and the extent to which that change is effected depends entirely on the speed. When the train is standing still it is useless as a ventilator. The problem of ventilating a passenger car, however, is an entirely different one from that of ventilating a sleeping car, and what is good for one doesn't do at all for the other.

SOLID STEEL WHEELS FOR PASSENGER CARS.

The full discussion by George L. Fowler is printed in another column.

WHAT CAN THE MASTER CAR BUILDERS DO TO SECURE THE MORE RAPID MOVEMENT OF FREIGHT CARS AND PREVENT DELAYS UNDER REPAIRS AND INSPECTION?

J. E. Muhlfeld (B. & O.): It is a well-known fact that a freight car, in addition to performing its legitimate work of transporting traffic, is required to withstand a 25-mile per hour impact when loaded and passed through gravity and hump yards; to be kicked, poled, roped and cornered; to be mauled and turned upside-down for dumping; to receive red-hot lading, such as billets, pig iron and slag; to resist the steam, fire and dynamite that is used to loosen frozen loads of coal, sand and ore; to submit to the depreciating action of acids, alkalis, water and weather; to retain any load that can be safely got into or on top of it; to endure loading by crane hoist; to undergo removal of lading by clam shell, scraper or plow; to be able to lose any part of itself that may facilitate loading or unloading, and withal to retain its identity and return to its owners after a year's sojourn in Canada, Mexico and the United States with a clear record against delay, failure, personal injury, loss or damage, and the Interstate Commerce Commission inspection. Assuming, however, that the transportation and traffic departments may have exhausted their means to increase the movement of freight by the greater lading and quicker handling of cars, there is no doubt that the Master Car Builders can render additional assistance. From the past year's experience and considering only equipment now in use, it appears that consideration should be given to the following:

(1.) Regulations to facilitate the handling at interchange points of loaded freight cars that are safe to move.

(a) If the Master Car Builders' rules are to facilitate the disposition of cars in interchange service and to properly place the responsibility for defects which may or may not make them unfit for movement, what objection should there be in stimulating car

owners to make substantial repairs to equipment before it leaves the home lines by the inauguration of a rule such as:

"When a loaded car contains specified owner's defects which do not render it unsafe to move but make it liable to develop a delivering company's combination of defects, it must be accepted from owner's line if covered by a liability card authorizing repairs to, or acceptance of car on the owner's line with such a combination of defects as may properly be the result of the specified owner's defects."

Such a rule should not only facilitate the handling of loaded cars and keep them moving as long as in a safe condition, but it would also require the owners to apply the necessary betterments and repairs to equipment that they offer in interchange for the purpose of maintaining it in substantial condition and thereby relieve themselves of extraordinary expense due to cumulative repairs that are now made necessary on account of not taking "the stitch in time" when they have the cars in their possession.

(b) Another matter that should be given consideration is to make loaded and empty cars acceptable at all interchange points on such roads as will insure proper accounting for repair charges. This can be done by agreements between connecting lines providing for the appointment of joint inspectors who will prevent the holding of equipment and transferring of lading on account of too much or unintelligent inspection and on technicalities.

(c) It would also be well to establish the fact that progress is being made in interchangeability and shop practice by specifying that bad order cars shall be no exception to the rules governing serviceable cars except where they are unsafe to load on account of general worn-out condition due to age or decay. The continuance of the per diem on foreign cars during the period they are held for owner's material for repairs would certainly result in much less time being taken to make the repairs than what now occurs.

(2.) Competent interchange and terminal car inspectors.

Taking into consideration the regular and special rules covering the inspection, condition, repairs, loading, clearances, billing and movement of freight cars, as issued by the Master Car Builders' Association, Interstate Commerce Commission and the railroad transportation and mechanical departments, it is not difficult to understand the urgent necessity for labor capable of performing the interchange and terminal inspection in a way that will accelerate rather than retard movement. Instructions and criticisms have become so frequent and voluminous that we can certainly expect a vigilant car inspector, when loaded down with the same, to be able to determine upon one or more details in each car passing his inspection, that will delay its movement. It, therefore, becomes most essential that the chief, foreman, joint, leading, or other similarly classified car inspector whose duty it may be to supervise regular inspectors, shall be a man of such general qualifications that he can be depended upon to direct compliance with the rules in a manner that good judgment may decide to be safe and proper for all concerned, as well as consistent with the least delay to traffic and the greatest economy in maintenance.

(3.) More substantial repairs to cars when on home lines.

In consideration of the fact that the average serviceable freight car may have an earning capacity of from \$2.50 to \$3 per day, even when standing still for about 21 out of every 24 hours, it is easy to approximate the increased revenue that might be derived if the Master Car Builders could reduce the number of bad-order loaded and empty system and foreign revenue freight cars held over each day for all classes of accident and ordinary repairs (exclusive of defective cars held under load at destination and excepting after Sundays and legal holidays), to a basis of 3 per cent. of the total system and foreign revenue cars on the line.

However, it is an expensive procedure to clear the "cripple" tracks by the making of indifferent repairs, and where desirable system cars reach the shop tracks in an empty condition they should receive such renewals and betterments as will put them in a substantial condition, so that the repetition of the class of repair work that results only in temporary maintenance can be discontinued in order to reduce the successive line failures of equipment and detention to cars and traffic, as well as the continually increasing expenses for non-productive labor and material.

It is, therefore, especially urgent that the Master Car Builders shall promote the best interests of the shippers and dealers, as well as of the railroads they represent, by the inauguration of substantial repair practices that will insure the minimum delay of cars on the shop tracks and line of road chargeable to their general condition.

(4.) Thorough inspection, repairs and adjustment of cars before loading and careful attention to brakes, lubrication and lading after classification at load originating terminals.

Cars set off on the line of road due to bad order condition of couplers, draft attachments, wheels or brakes, heated bearings, shifted lading and other similar causes are usually the outcome of lack of proper originating terminal attention which results in accidents, destroyed lading and cars, reduced train rating, delays to traffic, blocking of passing sidings, engine and train crew overtime and extraordinary expense for sending labor and material out

on the line to make repairs. Regardless of whether system, foreign or private line equipment is involved, the Master Car Builders should see that all receive the same attention in this respect, as a foreign or private line car is liable to cause just as much, if not more, line trouble when under load than a home car.

(5.) Cars damaged by accident, but safe to move, should be repaired for return loading instead of being routed home empty.

Where at all practicable to do so, light mileage on account of condition of equipment should be eliminated, and when cars can be made safe to run and lading is available they should be put in condition for return loading.

(6.) The restriction to home lines of cars that are not suitable for interchange service.

At the present day nearly all railroads are offering in interchange some loaded and empty cars that are of such capacity, design or condition as to make them entirely unfit for the service to be performed. This class of equipment, which cannot be depended upon to promptly pass interchange inspection, should be restricted to those owners' lines where it can haul the maximum amount of commercial or company's use lading with the least liability for delays, transfer or repairs. Such a practice would assist materially in increasing carload-lot minima that may now be established in consideration of the Master Car Builders' capacity restrictions for certain cars containing double and triple loading.

(7.) Cars unsuitable for either company's or commercial use to be dismantled.

When a freight car of undesirable class and capacity has outlived its usefulness from the standpoint of commercial utility and reaches the home shop tracks in such bad order condition due to age, delay, corrosion or accident that the expenditure necessary to put it in serviceable condition is not justified, it should be dismantled. Connecting railroads handling either interstate or intrastate traffic should be assured of the absolute elimination of this class of equipment from further service on their lines.

In conclusion it may be stated that the great demand at the present time for increased facilities for moving industrial and agricultural products to market makes this topic of universal interest. The public insists upon railroads providing safe, fast and frequent freight service, such as can only be obtained from equipment receiving the most substantial attention in the way of repairs and inspection. The freight yard and train operations have become most severe on rolling stock. Relieving switchmen and brakemen of the necessity of going between cars to make couplings is no doubt responsible for much rough usage and failure of equipment. The gravity and hump yards and longer trains have also contributed generously to the cripple tracks. Furthermore, the conditions imposed by the placing of cars of light capacity and design between those of heavier types at the head end of trains, in combination with double, triple and overloaded equipment and the frequently reported "bad triple" and "burst hose" must also be met.

In view of the large number of cars in service that were designed and constructed long before the results from the changed conditions could be realized, the Master Car Builders deserve much credit for the progress that they have made in promulgating general practices and facilitating transportation. However, the urgency for the handling of freight now awaiting movement gives them an opportunity to further demonstrate their resourcefulness and broad, progressive methods by stimulating such action as will eliminate whatever sluggishness may still exist in the repair and inspection practices.

COUPLER SIDE CLEARANCE.

Le Grand Parish (L. S. & M. S.): On account of considerable difficulty having been experienced with broken wheel flanges on cast-iron wheels under cars of 80,000 lbs. and 100,000 lbs. capacity, it has been necessary to pay particular attention to the specifications and design of cast-iron wheels, and in a number of cases it has been considered necessary to use steel wheels under cars of 100,000 lbs. capacity. It would appear, however, that the most important thing to consider is the coupler side clearance. The draft gear committee of 1905 considered it important to recommend that the coupler clearance be increased from 1 in. to 2½ in. This recommendation was adopted. A number of roads have increased the coupler side clearance over 2½ in.

The Lake Shore has given this matter careful attention and for the past two years has allowed 4 in. coupler clearance with excellent results. The wheel flanges show very little wear and the general condition of the car indicates that 4 in. clearance is approximately correct. Dynamometer tests were made on the Lake Shore in 1905, which indicated a considerable increase in tonnage over a division having moderately short curves, on account of additional coupler side clearance. Owing to heavy business it was not possible to continue these tests to a definite conclusion.

J. J. Hennessey (C. M. & St. P.): I do not agree with the report. On sharp curves by giving more clearance you do not relieve the shock on the flange of the wheels but increase it. There is no question but that the strain on the end of the car and on the platforms is relieved. Where the flange shock and wear takes place is on the outside rail if there is any speed. In yards it is the

outside rail which is worn all the time, the lead wheel being crowded against the rail. If you set a block and tackle off at an angle of 45 deg. and pull on it with sufficient force, you will slide the wheel entirely away from the high rail toward the low rail. In street car service they have sharp curves, but they allow the couplers to pull in straight line, and the flange wear is very great.

J. J. Tatum (B. & O.): If a car is entering a curve, unless the coupler takes its position with the curve, great straining occurs, and such straining will finally reduce to a strain on the wheel flange and on the track. A swing motion truck is used simply to get a free movement of the truck under the car. It is as important to get a free movement of the cars coupled in a train, in order to get the train around a curve in a satisfactory manner, as it is to have a free movement of the truck.

J. F. Devoy (C. M. & St. P.): Some time ago, at the suggestion of Mr. Hennessey, we attempted to conduct some experiments which would definitely show just what pressure or strain there was on a car moving around a curve. It was only possible for us to take the car in its standing position. We coupled the cars together, marked the position of the coupler to the car at that time, and attempted then by calibrating springs, placing jack screws behind them, to determine just what amount of pressure it took to place the car uncoupled in the same position that it was in when coupled on a 20-deg. curve. It required as much as 4,200 lbs. A large coupler clearance aggravates wheel wear and flange wear. In passing around a curve with only 1-in. or 1½-in. clearance on one side of the coupler there would be a tendency to lead the car away from the track, thereby relieving the flange wear.

F. W. Brazier (N. Y. C.): The New York Central has 25 cars which have been running now about 2½ years, with 2½-in. side clearances. Our record up to two months ago with these cars was two pair of sharp flange wheels removed. These cars had a centering device. They are almost unnecessary, from the fact that the tandem spring, or Westinghouse, or any other draft spring, made with the tail straps, are so wide that the springs will bring the couplers back to center, unless there is too much slack in the pockets. We might as well wear out the flanges of the wheels as to pull the cars to pieces.

J. J. Tatum (B. & O.): We made some tests on a 27-deg. curve, and also on a 69-deg. curve. We found in taking two cars in on the curve, having ¾-in. side play on either side of the coupler, 1½-in. total play, that the car could not be coupled or uncoupled on the 27-deg. curve. It had to be backed out on straight track to get the car coupled or uncoupled. We also found in going around a 69-deg. curve that you could not get a 40-ft. car to curve around without uncoupling the car and pushing it around as a single car. We did find, by giving the coupler more lateral movement, that we could get the cars around the 27-deg. curve and a 69-deg. curve. One long car, which was very limited in its lateral movement, had the coupler badly worn on the side, the yoke on the rear end was badly worn and the center arms of the draft carrier were forced down. There was considerable strain there which should have been relieved.

C. A. Soley (C. R. I. & P.): It is important that we get a maximum safe clearance that can be utilized in coupling cars for the reason that the amount of swing at the end of a car varies so much, due to the overhang beyond the truck and the varying wheel base in trains of cars, all kinds and types coupled together. If you get a 2-in. clearance on one car and the adjoining car has a 2-in. clearance also, you never use all of that. A general movement toward increasing the maximum movement is desirable and should be encouraged.

W. F. Kiesel, Jr. (P. R. R.): Mr. Soley touched on one important feature—the varying length of cars. There are two other features—reverse curves and irregular curves. These are the three features which necessitate increased coupler clearances. We made tests with cars having ¾-in. clearance on each side, on irregular curves, and we found the wheels on the outside rails raised off the track as much as an inch. That would not have happened if we had had 1½-in. clearance on the side. All of the tests we made indicate the necessity for increased coupler clearances.

LeGrand Parish (L. S. & M. S.): We have several thousand cars that have coupler clearances of 4 in. We adopted these clearances to prevent broken flanges. On the cars which have been equipped with 4-in. coupler clearances we have yet to report a single case of broken flange. Some of these cars have been in service nearly two years. We found another important feature—the reduced wear on the brass.

C. E. Fuller (C. & A.): Nothing has been said relative to the steel or wooden car. The steel car requires greater clearance than the wooden car. We are considering very carefully the clearances on steel cars. We do not have any trouble with wooden cars. We are hauling long trains of coal cars, and it is noticeable how much easier we get the wooden car, with the same tonnage, over the road than we do the steel car of the same tonnage.

P. H. Peck (C. & W. I.): The pressure on the flange is very great. When we put some couplers on ordinary coaches we could not get around some of our short curves, and consequently we put a

drawbar with a movement of 2½ in. either way, and we got relief at once. If we put a rigid coupler on these cars, they will go off the track.

R. L. Kleine (P. R. R.): We made some tests in connection with coupling of cars on short curves and laid a special test track from 75-ft. radius up, varying about 10 ft. We found, especially with the steel cars, that with the wider coupler clearance, we could couple a curve of much less radius than we could where the clearance was limited. We went further and made the tests on a straight line to see approximately how much "off center" we could couple. We found that the center line of the car, in relation to the center line of the track, had quite a bearing. In some cases we found the body of the cars, due to the movement of the wheel flanges on the rail, movement of the bearings, etc., were off center as much as 1 to 1½ in. In coupling we found that from 2½ to 3 in. was the maximum at which we could couple on straight line. You will often hear trainmen say that they have difficulty in coupling on straight line, and that might explain some of these conditions. In fixing the maximum coupler clearance the committee should take into consideration the amount that the cars would be off the center.

We also had some experience with derailments, due to narrow coupler clearances. In going off on some of the branches with coke cars we found the cars would derail when they were running at a speed of from 4 to 6 miles an hour, and the train crews told us that they invariably got the derailments at these slow speeds. When they took the curves with the train stretched and going at a higher rate of speed they had no trouble. That indicated that the coupler shank was back in the car, which decreased the coupler clearance. Therefore, the wider coupler clearance would seem to be essential.

WOULD NOT TRUCK SPRINGS FOR FREIGHT CARS BE BETTER LAID ON THE JOURNAL-BOX THAN UNDER THE BOLSTER?

F. W. Brazier (N. Y. C.): That arrangement of the springs which will most effectively cushion all moving parts is the arrangement which should be adopted. Such an arrangement will not only protect the moving parts of the car, but will materially protect tracks, bridges, etc. If springs are placed on journal-boxes of freight cars, the non-spring supported parts are reduced to the wheels, axles, journal-boxes and contained parts. This will reduce the non-spring supported parts of our trucks to a minimum.

The rapid deterioration of truck frames, bolts, fastenings, etc., on arch bar trucks has long been recognized by the average car repair man. The increase in weight of the non-spring supported parts, which in the arch bar truck consists of the entire truck, excepting the truck bolster, taken in connection with the increased velocities, is fast becoming seriously destructive to trucks, tracks and structures.

The weight of the non-spring supported parts of an arch bar truck having M. C. B. axles 3¾ x 7 in. is about 6,000 lbs. The weight of the non-spring supported parts of the heaviest arch bar truck having M. C. B. axles 5½ x 10 in. is about 11,000 lbs. This uncushioned weight, by placing springs over journal-boxes, may be reduced to 3,600 lbs. for 3¾ x 7-in. trucks and to 5,200 lbs. for 5½ x 10-in. trucks.

The principle involved has long been understood, and the proper remedies applied in our modern passenger car trucks, and also in our locomotive leading trucks. However, we have sought to overcome the trouble in freight car trucks by increasing the weight of the failing members rather than by reducing the stresses in them. This increase in weight of uncushioned parts has not given us relief, and sooner or later we will recognize the true cause of the trouble and apply the proper remedy.

The race between the rigid and swing bolster freight trucks has been a long one, and the issue is not yet settled. We are suffering, however, from too much vertical rigidity, and this would be much reduced by getting our springs nearer the disturbing forces, which are at the point of contact of wheel and rail.

The New York Central has 30,700 cars equipped with trucks having springs over journal-boxes. Of these 30,700 cars 72 per cent. are cars of 60,000 lbs. capacity; 28 per cent. are of less capacity. The cars were built from 1898 to 1902. We have also 200 tender trucks, 5½ x 10-in. axles, and 800 tender trucks, 5 x 9-in. axles, built about the same time as the cars. The service given by trucks on above equipment has been very good. I am not here to defend the Fox trucks, but we have had less trouble with a truck of that character than with any other type of truck which we are running. All of our Fox trucks are sent to Buffalo for repairs, which are done at an average of \$8, and 75 trucks are sent to Buffalo on an average each month. We have less than 1 per cent. of derailments with this class of truck.

C. W. Wildin (Lehigh Valley): Do you keep the box lids on the Fox truck in rough track? Do you not have more trouble keeping the box lids on the Fox truck than with the springs in the center? On the Lehigh Valley it was almost impossible to keep the lid on the Fox truck or any truck that has a spring over the box. During the winter and spring, when the track is in bad shape, we have always had considerable difficulty with the lids on boxes of that type.

The Telemagnophone.

The telemagnophone is an arrangement by which one person can speak into one telephone transmitter at one point and have his words repeated at a number of other points simultaneously. It is really a loud-speaking telephone with numerous extensions. This system has just been installed in the Grand Central Station at New York for announcing trains, and was first tested there on June 25. Announcing instruments are at present situated in the main waiting room only. They are shortly to be placed in the restaurant, the ladies' room, the smoking room and the baggage room and on the concourse. In the main waiting room there are six instruments, five of which are placed on top of rows of seats and one over the information desk.

The telemagnophone is an aggregate of electrical devices. Connection is made by an ordinary copper wire from the transmitting station, charged with a small battery current. The sound reproducing instruments, two types of which are shown, are about 8 in. high, 4 in. wide and 4 in. deep. The horns are "S" shaped and about 9 in. long, with a bell about 4½ in. in diameter. The instruments shown are the double type, arranged to sound in two opposite directions, and the type with six horns to sound in two opposite directions like the double type, and in addition in four other side directions. The primary advantage of this system is that by it one man can operate, if necessary, more than 100 different speaking instruments. This system is the original invention of L. J.



Two Models of the Telemagnophone Reproducing Instrument.

Lippmann and has been worked out by A. G. Kaufman. It is manufactured by the American Callaphone Company, of 51 West Thirteenth street, New York City.

Solid Steel Wheels for Passenger Cars.*

It has been my privilege for the last two years to be engaged in an investigation of the merits of wheels of various character for use in passenger and in freight service under the patronage of one of the manufacturers of solid steel wheels.

The first thing that I did was to gather from all of the makers of steel tires in the country samples of steel tires. I want to go back for a moment and say that as I understand the question, it is not a question as to whether a steel wheel should be used in passenger service, because we have already decided that a steel tired wheel, or a steel wheel, is the proper thing to use, but it is a question as to whether a solid steel wheel can be made that will be safe and reliable for ordinary passenger service. The cast-iron wheel for the time being can be regarded as entirely out of the race.

In this investigation I first obtained these samples of steel tires that were in good, first-class condition. I went to my railroad friends, and they gave me a sample of all of the steel tires that are on the market that had failed—not all the tires that had failed, but a sample from each make that had failed by what is known as shelling out. In working out the comparative value of the metal of the wheels, I cut tensile test pieces from three points in the tread and tested those in the ordinary way for maximum strength, elongation, elasticity and contraction of area, and then in addition

to that I tested all of the material on what is known as the Martel scale for hardness. The Martel scale is one that has been adopted by the French government, as a standard of hardness, and it was originally developed by Colonel Rodman of the United States army, in the test of pressures of his guns. It consists in dropping a wedge of pyramidal shape, with a given weight behind it and a given height, upon the body to be tested. Experiments made in France have shown that the amount of metal displaced with a given form of wedge, or knife, and a given weight, varies directly with the hardness of the material. As far as the tensile strength is concerned, in all of these tires there is very little difference. It runs up with the carbon. The lowest carbon of any tire that is in standard use today that I was able to find was about 0.57 per cent. The highest was 0.716 per cent. The maximum tensile strength of these metals ran from 113,000 to 124,000 pounds per square inch. This does not mean, however, that the limit of elasticity was at all in accordance or in exact ratio to this tensile strength of the material. I found that the elongation varied practically with the carbon, and that it ran from 6.87 per cent. up to 29½ per cent., 29½ per cent. being, naturally, with the steel tire that had the lowest percentage of carbon.

I found that the elastic limit of these wheels ran from 72.63 per cent. of the ultimate strength up to 86 per cent. and you know that limit of elasticity is really the factor which we always work upon when we are using any metal in any kind of construction; and the peculiar thing about this is that while there is so comparatively little variation in the actual strength and the quality of the metals, it was the solid steel wheels which had the highest percentage of elasticity in relation to its ultimate strength.

As to hardness, there is also very little difference. That has



some slight connection with the carbon content of the tire, but it is practically what we call 375 degrees, running from a minimum of 783 degrees to 1,125. In this also the maximum of hardness was obtained by a solid steel wheel.

The carbon content varied from 0.573 up to 0.716 per cent. so that the carbon content is practically in accordance with ordinary general specifications.

From this it would appear that as far as the physical qualities of the metal are concerned, and as far as it can be determined by purely laboratory tests, the metal that is put in the solid wheels, the forged wheels, is something that can be entirely depended upon as far as safety is concerned.

The economy of the wheel depends upon its rate of wear per 1-16 inch, its usual cost and the value of the scrap after it has been worn out. In regard to the scrap value, and its initial cost, I have nothing to say. I can only refer the members to the manufacturer, and they will obtain there, probably, the information that will enable them to settle the matter definitely as to whether it will be economical to use the steel wheel or not.

In regard to the wear of the wheels in actual service, I have here the records of steel wheels that have made a mileage of 25,618 miles per 1-16-in. wear, and with a total mileage of from 154,700 to 184,000 miles before the first turning, and the wheels are still in good condition. These wheels are also used very extensively for street railway service, where elements enter into their use which are not a factor in steam railroads. That is, the rapid wear of the ordinary wheel and the value of the car in saving or preventing it from going into the shop for wheel renewal. There because of brake action, the condition of the rail, and other things, the wear of these wheels per 1-16-inch drops very much below what you get on the

*Topical discussion at the Master Car Builders' Convention, by George L. Fowler, Associate Editor of the *Railroad Gazette*.

ordinary steam road. It runs from 7,000 to 9,000 miles per 1-16-inch wear.

As to the cause of shelling out, there are a great many theories advocated and promulgated. Some claim that there is a cleavage along the ferrite lines in the wheel, i. e., that there is a shortness in the metal that causes it to grow in cold weather, but it is a curious fact that of all the shelled out steel wheels that I was able to obtain, slag was the cause of shelling out in every instance. In all of these wheels, both new and old, I took sections and had microphotographs made, some 500 in all, and I have some most beautiful examples of slag in steel, and in every case where the wheels have shelled out the wheel was simply impregnated with slag everywhere. My first section was taken right through the shelled out spot, so as to get the bad conditions that had caused that immediate trouble, but by taking a sound part of the wheel where there was no indication whatever that shelling out had taken place or was likely to take place, I still found that that tire was full of slag. There may be other reasons for the shelling out of steel wheels, but I did not find them. That, of course, is no reason for saying that they do not occur.

In both solid and ordinary steel wheels shelling out occurred more frequently in winter than in summer, and more under a tender than under an ordinary passenger car. The reason I would suggest for that is this, that the line of cleavage following down the slag lines, as I could follow out very readily with the microscope, the cold weather renders the metal brittle to a certain extent, and that cleavage naturally runs along more rapidly under those conditions and under the hard service of winter wear, and the result is that we have a shelled out spot more in the winter than we do in the summer. In tender service, it is due, I think, entirely to the excessive intensity of the service which the tender is called upon to perform. A tender is practically running a great deal of its time without any springs. Springs are put under the tender to carry full load. Those springs are very stiff, and when the tender is nearly empty at the latter part of the run, both in coal and in water, the springs are so stiff that they give almost no spring action whatever to the body of the tender. The result is a pounding on the wheels that is exceedingly severe. On the ordinary freight car, running at ordinary speed, with the springs in position, the load is from 25 to 40 per cent. in excess of the load that is put on the bolster. With the springs off the car entirely what the load on the wheels may be I do not know, but certainly it will be more than the 25 or 30 or 40 per cent. in excess which I have found by actual measurement to be the case with the springs in position under a freight car. The solid wheels that have been successful and have obtained any wide amount of adoption have been those upon which work has been put, I mean work in the form of rolling that is similar, or forging that is similar, to that which a tire receives while it is cast from the blank, and the earlier wheels were so cast; the wheels that have been made in this way, have thus far not been satisfactory.

I do not think that there is any doubt whatever but that the cast blank can be made so that it will be perfectly safe for ordinary purposes, but in casting the blank there is always more or less slag carried from the surface of the mold into the tread of the wheel, which makes it very liable to shell out when it is put in service, and this occurs also in those tires where the ingot is not properly cropped and properly trimmed before it is rolled into the tire. I have found quite a number of tires that had evidence of slag from the surface of the ingot in them, from being improperly taken care of at the mills where they were made. That is practically the trouble that we had with the cast blank. I make a distinction between a cast blank wheel where the wheel is cast approximately into the form of a wheel and then given some surface rolling, and one where a slice is simply cut off the ingot, cut and rolled, and that the whole shape of the wheel is changed.

By examining those wheels with the microscope, we find that the penetration of the rolling into the solid steel wheel is about the same and is very similar to the penetration due to the rolling that we find in the ordinary steel tire. You can see surface indications and you practically can count the number of heatings that have been obtained with the wheel, and see how it has worked down into the centre of the wheel by a careful examination with the microscope, and in this connection I want to say that upon defective metal, or the metal upon which any doubt is brought to notice, there is nothing in the world that will show things out so clearly as the microscope. I had a case a little while ago of a large drawbar which had broken between the engine and the tender. It was a most beautiful fracture; there was absolutely nothing that you could see with the eye to show why that should break, but when it was etched and looked at under the microscope the story was as plain as day. It was simply full of slag, and there was very little metal in it. These causes of shelling out are all that I have been able to find, that is, the slag, and I do not know how much further it will go.

I want to say one word in regard to the relative values of steel and cast-iron wheels for all services. I have had some very peculiar results. I do not feel like saying that they are absolutely sure,

but they certainly are peculiar indications. I took a pencil from a cast-iron wheel, just as though I had bored down into the tread with a hollow bit, and I had a piece about as long as my finger and a half inch in diameter, which I put on an emery wheel and loaded with a fixed weight, and measured the number of revolutions to grind off each $\frac{1}{8}$ inch. I did that with all my steel tires also. To my intense surprise, I found that my cast-iron ground off about four times as rapidly, even in the hardest part of the chill, as any of the steel tires or wheels, though I got the apparatus for the purpose of grinding steel. I went to the manufacturers, the carbide people, told them what I wanted to do, but said nothing at all about cast iron. They gave me a wheel from which they said I would obtain the best results, and the most satisfactory data for the purpose. I used it, and it was not until afterward that I put the cast-iron pieces on. After I had obtained these results, another manufacturer of emery wheels told me I was entirely wrong in my conclusions, because a wheel that was adapted to grinding off steel would not grind cast iron with equal efficiency. In other words, it was not adapted to grinding cast iron, and yet this wheel that was not adapted to grinding cast iron did grind it four times as rapidly under identically the same condition as it did the steel wheel. I then put a cast-iron wheel and a steel wheel in the testing machine, and skidded them, weighing the load and weighing the pull required to slip it, and my previous experiments with the metal pencils were simply checked; that is, that every spot that I got on my cast-iron wheel accounted for just almost exactly four times as much metal as I removed from the steel wheel under the same conditions. That was further checked by the fact—now probably I will receive any number of contradictions—that on a certain railroad we found that it took us about four times as long to grind off steel as cast-iron wheels. To take the thing still further, I upset my porridge completely. I put a steel and cast-iron wheel on the same axle with a load of 24,000 lbs., and put a brakeshoe upon each side of the wheel so as to be able to skid it under any conditions. I then pulled it over a piece of track about 1,800 feet long that was in thoroughly good surface and alignment, and then I did the work at a speed of from $2\frac{1}{2}$ to 3 miles an hour. I found that the metal removed, as accounted for by the flat spot, was about four times as much for the cast-iron wheel as for the steel wheel. But when I increased this speed to from 16 to 17 or 18 miles an hour, I exactly reversed the conditions. The heat that was developed by the high speed simply reversed the wearing qualities, as far as skidding was concerned, of the cast-iron and the steel wheel. But inasmuch as almost all skidding is done at comparatively low speed and comparatively short distances, the fact is that the cast-iron wheel does flatten more rapidly under those conditions than the steel wheel. This accounts for the almost universal experience that flattening is more common with cast-iron than with steel wheels, because the work was done while the metal is cool, and in all my laboratory experiments I took great pains to keep the metal cool. It is this element of heat which reverses the action that is found elsewhere.

Another peculiar thing, perhaps a little off of the subject, is the effect of the weight of steel and cast-iron wheels on the rail. I think in 1887 the Master Mechanics' Association had a discussion in regard to the proper weight to put on the wheels, and it was decided in that meeting that about 12,000 lbs. ought to be the limit. Now we are putting on 28,000 lbs. In some cases 20,000 lbs. is not an extreme case for a high capacity car. By loading cast-iron and steel wheels on the rail from 500 lbs. to 150,000 lbs. I found that at 20,000 lbs., with the ordinary steel rail of 55 carbon, there was a spot left in the rail, that is, that there was a depression you could see. That was checked off not only by the wheel and rail in ordinary conditions, but by a wheel and rail that had been polished to smoothness, and the same thing occurred at about the same figures, between 19,000 and 20,000 lbs. On the other hand, at 150,000 lbs., I could find no effect on the wheel, either on cast-iron or steel wheel. I started out to smash the cast-iron wheel and failed. I could not do it by simply loading it vertically on the rail. I have here diagrams which show that after the wheel has gotten up to about 37,000 lbs. it begins to break down the rail very rapidly under the cast-iron wheel; in other words, that the whole of the compression or depression is in the rail between the two metals, and that the cast-iron wheel does not partake of this at all, so that the rail has to take the whole strain, and that this excessive load put on the rail breaks down the metal and causes it to give way and the size of the spot to grow, and it grows very much more with cast-iron than it does with steel wheels, simply because the cast-iron wheel does not take up part of that compression itself.

That is the case I have to present for the solid steel wheel, that its metal is fully equal to that of the ordinary steel tire, and in this connection I want to add one word more. You will remember those very valuable experiments of Professor Goss, two years ago, I think, in which he gave the strength of the flange of a cast-iron wheel as ranging from 40,000 to about 90,000 lbs., with an average of 70,000 lbs., though in my own work I did not obtain one wheel that broke at 116,000 lbs. That is to say, that is the pressure that was required to break the flange directly back off from the wheel.

On a solid steel wheel the pressure required was 556,000 lbs., so that so far as the strength and wearing qualities are concerned they stand fully on a par with the steel tire. There is no doubt but that the steel wheel is simply sufficient to do the work. So that in summing up the case it seems to me that so far as the physical and chemical qualities of the metal in the wheels are concerned, and as far as the results of wear in service are concerned, the solid steel wheel, in showing what it has accomplished and what it can be depended upon to accomplish, is fully equal to the steel-tired wheels, and it simply remains a question of price and the value of the scrap and the other elements which enter into it, to decide as to whether the solid steel wheel shall be used in passenger service, or whether it shall be laid aside and the built-up steel-tire wheel be used in its place.

Railway Telegraph Superintendents.

The Association of Railway Telegraph Superintendents held its annual meeting at Atlantic City June 19, 20 and 21, President E. A. Chenery (Mo. Pac.) in the chair. After the completion of routine business the first paper was one by Mr. H. C. Hope on the examination of telegraph operators for railroad work. This will be published in the *Railroad Gazette*. In the discussion of the paper, Mr. Griffith of the Erie invited the members to visit the training school maintained by his company at Elmira, N. Y. At that school students are taught a number of branches of railroad work, but the telegraph course must always be taken first.

This finished the forenoon, and in the afternoon papers were read by Mr. F. E. Bentley on the Superintendent of Telegraph and by John D. Taylor, of the General Electric Company, on Inductive Disturbances of Telegraph Wires by Parallel High-tension Lines. This question was also the subject of a paper by W. C. Stowell (C. & A.). Discussion on this subject was long and detailed, members telling of their experience and of means which had been taken to overcome disturbances. Mr. Griffith, of the Erie, said that in the vicinity of Rochester, N. Y., he had had to put up metallic circuits to get rid of inductive interference.

The second day was begun with a paper by S. L. Van Akin, Jr., Assistant Superintendent of Telegraph of the New York Central Lines on the operation of long distance telephone lines. Mr. Van Akin described the organization of the telegraph and telephone service on his lines, emphasizing the features in which a railroad is at a disadvantage as compared with the telephone companies. The railroad has, however, an advantage in that it can use the Wheatstone bridge for locating trouble. The speaker described the duties of the monitoring wire chief as follows:

He should watch the lines closely for any irregularities in the service, such as line trouble, noisy connections or unlawful use of the lines. He should see that employees are attentive to duty, that the rules and instructions for the operation and maintenance of the service are complied with, that employees are courteous in the performance of their work, and that all calls are promptly and properly established, and no partiality shown in the matter of precedence to establish connections. He should assist in any lawful way to accelerate the service, establish morning test calls and, whenever necessary to improve transmission, place telephone repeaters in the line and see that they are always in good condition. He should be responsible for the prompt clearing of the line of all switchboard connections on through calls, test the line to ascertain positively whether all switchboard connections, simplex coils, bells, etc., have been removed, and the line connected through at test boards and test panels before establishing the connection. He should keep a complete record of all interruptions and trouble on the line, and inform the Superintendent of Telegraph promptly of such interruption or trouble and advise him when communication is restored. He should check the standard of insulation and resistance of the entire line at least once each month.

Wire chiefs should be located at division terminals if possible, as is also the case with the monitoring wire chiefs. The latter, however, must be located at telephone repeater stations, where repeaters are used, and these stations should be equipped with every convenience for the proper handling and supervision of the service.

The telephone set on a monitoring board should be equipped with a high impedance receiver, so that the monitor can remain in on connections without noticeable loss in transmission; and, if a small switchboard is necessary at such a point for switching long distance connections, he should, to be in close touch with the operators and operation, handle it personally when on duty, and closely watch the nature of the business transacted.

One of the most important duties of a monitoring wire chief is to see that all stations have equal opportunity to establish calls. He must promptly forbid unauthorized calls.

To transact a maximum amount of business, it will be found necessary to limit calls during office hours to three minutes, excepting those made personally by certain company officials, whose communications should be unlimited. In order to protect unlimited service calls, a list of those entitled to unlimited service and precedence should be compiled and embodied in the fixed rules.

On the New York Central Company's line between New York and Buffalo, and the Lake Shore Company's line between Buffalo and Chicago, precedence and unlimited service are accorded to the President, Vice-Presidents, General Managers, Assistant General

Managers, General Superintendents, Superintendents of Telegraph (who are responsible for the service) and Chief Engineers.

On account of the lines referred to being used for both short and long connections, the direct New York-Chicago circuit is connected into nine private branch exchanges, and at each of these points the line is bridged with 2,500 ohm bells; and, to operate Morse over the New York-Buffalo section, the line is equipped with six No. 37-A repeating coils. The impedance offered by each of these coils is equal to about 40 miles of No. 8 B.W.G. open copper line metallic circuit.

It was impossible to obtain good transmission on the line "bridged" with bells at seven intermediate stations, and with, approximately, the equivalent of 240 miles of additional circuit, due to the repeating coils, therefore it was necessary to inaugurate a system to quickly clear the line of everything that would impede transmission, as follows:

The signal symbol "39" is authorized by operators and wire chiefs on all calls between points on the New York Central lines and points on the Lake Shore lines exclusive of Buffalo. The operator at the originating station immediately clears the advance line of limited service calls, and passes the symbol, naming destination to the advance station, and then notifies the home wire chief. Operators at intermediate advance stations immediately clear the advance line, relay the symbol and notify their wire chiefs of the "39" connection. The wire chiefs so notified, immediately acknowledge the symbol call notice to the monitoring station and connect the line straight through at the line jacks. As soon as the monitoring wire chiefs are in communication on all New York-Chicago calls, it requires about 30 seconds to test the line between Ravana, N. Y., and Elkhart, Ind., a distance of 700 miles, to see that it is absolutely clear of all office equipment. If they find that some one has failed to connect the lines straight through, which is very seldom the case, it may take an additional one minute to remove the remaining equipment. Assuming that the line is found to be clear, they immediately notify the originating and terminating stations to proceed, and at the same time insert the telephone repeaters in the line. To follow these instructions to the letter and establish a call between New York and Chicago covers a period of about six minutes, and the quality of transmission is dependable. By the process described, all difficulties due to the "bridging bells" have been removed. The line is shortened, approximately, 240 miles by the removal of the simplex coils and, as the two sets of telephone repeaters are equivalent to 360 miles gain in transmission, the total 970 railroad miles is reduced to 610 open line transmission miles.

After a through "39" call is completed, the monitoring wire chiefs, who are monitoring the service at the repeaters, immediately notify all intermediate wire chiefs, by Morse, that the line is released from the through service. The intermediate wire chiefs watch a designated wire until the notice of release is received, whereupon they connect all equipment normal and notify their switchboard operators accordingly. The telephone circuit is cleared and placed in local service in 30 seconds.

In the local operation of the line no two stations are allowed to hold the line to establish more than six calls or for a time period of thirty consecutive minutes. Unless the use of the line is so limited, it would be impossible to transact business between all points without protracted delays at one point or another.

Telephone service on the New York Central Lines was proposed in 1902, authorized in June, 1903, and the line construction completed December 3, 1904; but the quality of transmission obtained between New York and Chicago was very unsatisfactory up to August, 1906. Established precedent in the operation of the line was the principal cause for much of the confusion and difficult transmission experienced previous to this date; the radical departure outlined above has brought about the present satisfactory conditions. The New York Central officers now believe that their New York-Chicago service is decidedly better than what they can get from the commercial lines.

In the discussion of Mr. Van Akin's paper, reference was made to an underground telephone cable between New York and Philadelphia, which it was declared has not proved economical. Pupin coils are used in this cable.

Mr. Chetwood described a new design of telephone instrument which is used for transmitting train orders on a branch of the New York Central.

In the afternoon Mr. G. A. Cellar, of the Pennsylvania Lines West of Pittsburgh, described some concrete telegraph poles which he has put up.

Mr. Cellar prefaced his account of the concrete poles which he has erected with a brief review of the history of timber poles. As long as timber poles are used he believed that they should be treated with a good preservative for 2 ft. above and 2 ft. below the surface of the ground, feeling sure that this will amply repay the cost of the work. Steel poles of various designs are in use for telegraph lines and kindred service, but steel is not much longer lived than wood unless the inside as well as the outside of the structure is open to inspection and for reapplication of preservative. Reinforced

concrete, however, has unlimited possibilities. Moreover, the railroads, with their better protected rights-of-way, are now prepared to use shorter poles than heretofore. In Europe where trespassers are kept off the right-of-way short poles are the rule.

Concrete poles were used on the Panama Railroad in 1856, but they were not of good design. In late years a few poles have been put up at Hampton, Va., and Brooklyn, N. Y., those at Hampton being of triangular section measuring 12 in. on each side at the bottom and 6 in. at the top. These poles are 30 ft. long. The Brooklyn poles are 60 ft. high. At Brownsville, Pa., there are poles 150 ft. high supporting a wire 1,014 ft. long stretched across a river. These poles, however, have anchorages.

Mr. Cellar's first concrete poles were put up at Maples, Ind., 53 of them. These he described. He calls his description a progress report, and does not claim to have yet hit upon the most suitable shape.

The poles are 30 ft. long and of two shapes, one square and one octagonal. The upper third is solid and the lower two-thirds hollow, the thickness of the walls being from $1\frac{1}{4}$ in. to 3 in. These poles weigh 3,500 lbs. each and withstand any strains that are likely to be put upon them by a line of 50 wires, with each wire coated with enough ice to make it 1 in. in diameter. In testing these poles they were set in concrete bases 3 ft. x 3 ft. x 5 ft., and they were compared with cedar poles of the same length set in the same kind of base. The concrete poles are reinforced with four round iron rods 24 ft. long, $\frac{3}{4}$ in. in diameter, close to the surface, and four similar rods $\frac{1}{8}$ in. smaller. The octagonal poles are 13 in. in diameter at the base and 8 in. at the top, tapering 1 in. to 5 ft. Holes are cast in the poles for cross-arm bolts and wooden blocks are set in at suitable places to support galvanized iron steps and cross-arm braces. The poles were tested by a horizontal pull 10 in. from the top. The concrete poles failed by breaking near the ground line after being pulled from 25 to 39 in. from the perpendicular with stresses of about 3,000 lbs. After the concrete had broken the reinforcing rods resisted a pull nearly as great as that required to break the concrete, the wooden poles bent to arch shape before breaking. The concrete mixture was 1-3, but Mr. Cellar thinks that 1-2-4 would be better. He is not sure that the hollow post is the best design. Cement is a good insulator.

Mr. Cellar proposes to put up some steel poles embedded in just enough concrete to serve as a preservative; also some steel poles covered experimentally with a cement paint. He is also experimenting with reinforced concrete cross arms.

In the discussion of this paper, Mr. Camp, of the Canadian Pacific, told of the experience of his company in building telegraph lines. On the 11,000 miles of railroad owned by this company, all of which is equipped with telegraph lines, every pole is cedar; and timber is so cheap in Canada that concrete is not likely to find much favor there for a long time. Prices of poles are, however, advancing because of the great demand from the United States. On the western prairies the Canadian Pacific has to haul poles in some cases 550 miles. Thirty-foot poles now cost \$1.30 on the cars at points on the Atlantic division of the road; \$1.50 on the Lake Superior division; \$1.85 on the Central division, and \$1.20 on the Pacific division. Experiments with preservatives have proved too costly to be continued. The life of cedar poles is extremely variable. On lines erected in 1877, about half of the poles are still good for a few years' more service.

The next paper was one by U. J. Fry (C. M. & St. P.) on dry batteries, the use of which for short block signal circuits has proved highly economical on Mr. Fry's road. This paper will be printed in a future issue.

A brief paper was presented by Mr. R. L. Logan, Superintendent of Telegraph of the Kansas City Southern, describing his practice in connection with error sheets received from the Western Union Telegraph Company. He has a regular form for sending such sheets to the managers of offices along his line, in which he warns the manager that after a given date the original messages for the month in question are to be destroyed. The manager is to send postal card inquiries to offices with which there is a disagreement, and if a response is not received in 10 days he is to send a duplicate postal card to Mr. Logan's office. An agent who leaves the service at his station while an error sheet is pending must take a receipt for it from his successor. He must keep a memorandum of the correspondence and make all remittances by express.

Mr. Logan sends these sheets to agents by registered mail, and if in 10 days he does not receive a receipt he calls the agent to account; in 20 days he sends a sharper notice. Where a message has been sent collect and the receiving office has come back with a demand for collection from the sender and has not been satisfied, Mr. Logan calls for the settlement of the error within five days. He keeps a full record in his office of all error-sheet communications, so that the loss of one of them need not cause serious delay. The Western Union now requires original messages to be preserved eight months instead of six months as formerly.

Mr. G. W. Dailey, of the Chicago & North-Western, read an interesting paper on Opportunities in the Telegraph Service, in which he held up a high ideal of efficiency for operators, despachers and

all classes of telegraph employees. Describing the ideal agent, Mr. Dailey said:

He realizes the importance and responsibilities of his position. He is the color sergeant of his company. He knows he is practically the General Manager and everything else at his station, and that the road he represents is gaged by his calibre and is judged as he is judged. It stands in the estimation of the community largely as he stands. He is representative of it. He keeps peace in the family and in the vicinity; keeps his officers posted as to everything of interest in his community; knows he can do more good advertising for the company than any one else, and does it. He does not complain that his salary is too small, but says he will make himself so valuable that they cannot get along without him, and that they will have to promote him, when he will receive more salary. He reasons that so long as he is a part of the organization he wants to be a strong part and do everything to further its interests while he is a part.

He does not disparage the company he works for, as that would disparage himself. If he can't get in line he will get out. He isn't carrying water on both shoulders. If a member of a labor organization, he is loyal to both and to the advantage of both. If he has any trouble or grievances he does not proclaim them from the house tops, but wisely keeps them in the railroad family and doesn't trouble the general public with them. When his townsmen feel that they should be in fashion and do a little legislating against the railroads, he knows that he can do more than any one else on the road to offset it, and does so. He tells his neighbors some of the good things his company does; gets out and shows people where they are misinformed and what the road has done for their town, even though they won't admit it; explains many things that are not understood; stands by his colors so well that even his opponents respect him for it; tells his town people that his company is the best on earth, and says it so often, and stands by his guns so well that by and by they think so themselves. They also think he is the best agent on earth, and wouldn't have any other. After a while the company finds it out and he is promoted. He has made and improved an opportunity.

Mr. Dailey holds that the train despacher, who has to look after cars and motive power as well as trains, should not be charged with the duties of examining, appointing and supervising the station telegraph operators. He urged his hearers to go over their lines often enough to keep acquainted with their men. The man at a small station has no opportunity to talk with the officers, and if he is to improve himself he has to perform the task under constant difficulties. He absorbs his ideas from the men with whom he works, instead of from an approved and authoritative source. The night operator especially, at a country station, may be a failure or may quickly qualify himself for a higher place, according as the despacher guides, counsels and encourages him, or fails to do so. A supervising officer, whether a superintendent or despacher, should find ways to keep in touch with the operators and agents. By proper effort these men can be shown that belonging to a brotherhood does not necessarily prevent them from being loyal to the company.

Owing to lack of time, papers on Standard Time, by W. J. Camp (C. P.); on the Railway Telegraph Service, by J. Browne; on the Visible Supply of Telegraph Poles, by W. W. Ashland, and on Uniformity in Office Installation, by E. Parsons, were ordered printed without being read.

Montreal was selected as the place for next year's meeting, and the date is June 24, 1908. The election of officers resulted in the choice of E. P. Griffith (Erie), New York City, President; W. J. Camp (Canadian Pacific), Montreal, Vice-President, and P. W. Drew (Wisconsin Central), Milwaukee, Secretary and Treasurer.

The foregoing completed the business of the second day. On the third day a paper on Wire Testing was read by L. M. Jones (A. T. & S. F.).

The convention having voted in favor of holding quarterly meetings in the East and in the West, the new President, Mr. Griffith, announced the appointment of Charles Selden, of Baltimore, chairman; L. B. Foley and A. B. Taylor, of New York, as a committee to have charge of the quarterly meetings in the East; E. A. Chinery, of St. Louis, chairman; John L. Davis, of Chicago, and C. S. Rhoads, of Indianapolis, as the committee to have charge of the quarterly meetings in the West. These committees will notify the individual members of all quarterly meetings and the nature of the business to be transacted.

E. H. Grace, of Chicago, chairman of the standing committee on wire crossings, reported the work of his committee during the past year. Its labors consisted, among other things, in furnishing information to legislators regarding wire crossing on railroad rights of way. The report also included extracts from the state laws on the subject as found in various western and southern states. Loose practice in the construction of wire lines across railroads is still prevalent.

The committee on uniform pole construction has submitted to the members a list of questions, and from the answers a paper will be prepared on this subject for the next annual meeting.

Mr. J. L. Davis, of Chicago, read the report of the committee on Uniform Transfer Blanks, which were designed for the purpose of transferring incomplete business from one operator to his relief when his duties have been finished.

While in Atlantic City the members were invited by Mr. Marshall, of the United Wireless Company, to visit the wireless station there, which was in constant communication with ships at sea and with stations along the coast.

Railroad Track of the Present and Its Possible Future Development.

At the May 29 meeting of the Western Society of Engineers, Mr. J. W. Schaub, Consulting Engineer, Chicago, presented a paper on the above subject. The wave motion in track, with its attendant creeping of the rails and possible breakage of rails, particularly where the ballast and substructure are frozen to uneven hardness and there are low joints, was touched on first. Reference was made to the investigation of the New York Railroad Commission on rail breakages covering the first quarter of the current year and reported in tabular form in the *Railroad Gazette* of May 17 in connection with the article on "Defective Rails." This article, and the extracts from letters from railroad officers accompanying same, were referred to in the paper and the illustrations of defective 100-lb. rails in connection therewith were reproduced in the stereopticon views with which the paper was illustrated. The quality of rails was next referred to, following which the paper said:

Is the difficulty due entirely to the poor quality of the rail? We have heard much of the speed with which rails are rolled, and of the high temperature of the steel when on the cooling bed. This may account for some of the difficulty; but, on the other hand, is the structure upon which the rail rests free from blame? To be sure, the quality of the steel can be improved, but so can the sub-

all track shows, more or less, the effect of the lack of continuity in the rail by the dip of the rail at every joint. This happens in an instant, the operation is repeated by the next wheel, and so on (Fig. 1). Assuming the deflection of the end of the rail to be " Δ " when the tie reaches a firm bearing:

Let W be the wheel load;
Let l be the space between the supports;
Let E be the modulus of elasticity of the steel;
Let I be the moment of inertia of the rail section.

Then
$$\Delta = \frac{W l^3}{3 E I} = \frac{(W l)^2}{3 E I} = \frac{M l^2}{3 E I}$$

Let f denote the fiber stress on the rail due to bending;
Let y_1 denote the distance from outer fibers to neutral axis.

$$M = \frac{f I}{y_1} \therefore \Delta = \frac{f l^2}{3 E y_1} \therefore f = \Delta \frac{3 E y_1}{l^2} \quad (1)$$

Equation (1) shows that for a given deflection of a rail the fiber stress varies directly with the distance of the outer fibers from the neutral axis, and nothing else. In other words, if the rail deflects until the tie brings up on a firm bearing regardless of the wheel load, then the stiffer the rail the more work it will be called upon to do, and consequently the higher the fiber stress on the steel will be. Now, is this not approximately what takes place under ordinary conditions? The load comes on the rail and if the rail lacks a firm bearing it will deflect until it finds a reaction. Equation (1) tells us that in order to reduce the work done by the rail it will be necessary to reduce the value of Δ . In other words, make the ballast and substructure as unyielding as possible so that the rail will be relieved from a duty which it is not qualified to perform, and which it should never have been called upon to perform.

To illustrate, let us assume that a fiber stress of 15,000 lbs. per sq. in. is acceptable for a working load, and y_1 for a 60-lb. rail to be 2.15 in., $E = 30,000,000$, and $l = 40$ in.; then for a 60-lb. rail,

$$\Delta = \frac{15,000 \times 1,600}{3 \times 30,000,000 \times 2.15} = 0.124 \text{ in.} = \frac{1}{8} \text{ in.}$$

Whereas, the fiber stress for an 80-lb. rail corresponding to a deflection of $\frac{1}{8}$ in. is 18,000 lbs. per sq. in. In other words, for the

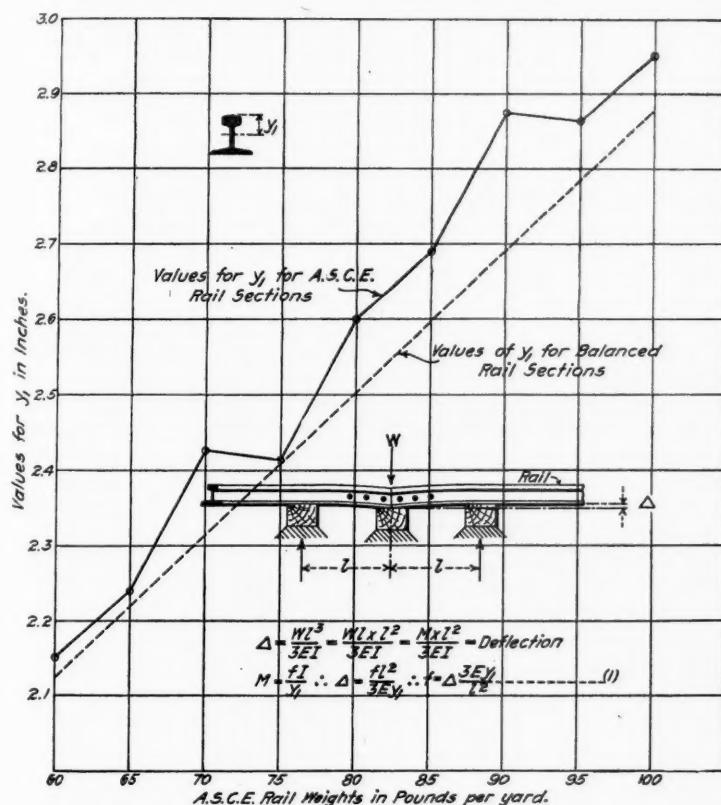


Fig. 1.

In the values for y_1 for A. S. C. E., and for balanced rail sections, it will be observed that the 75-lb. A. S. C. E. section comes practically on the balanced-section line, while the 90-lb. is the farthest away.

structure upon which it rests in the track. If it is true that the heavier rail sections have shown a higher percentage of breakages than the lighter sections under the same conditions, then the cause of the rail breakages should not be hard to find.

Increasing the weight of the rail in a track does not necessarily make a better track than a lighter rail does. Something must be left for the ties, ballast and substructure to do. If the original form of railroad track, with its strap rails laid on longitudinal timbers resting on cross-ties, had been developed along these lines to its logical conclusion, the present form of railroad track would have been unknown. Let us see what are some of the defects of the present cross-tie system of rail support. In the first place it is not mechanical. Given a line of rails which have to carry moving loads reaching 20,000 or 30,000 lbs. and more per wheel, the loads which they carry must be distributed over large areas. The cross-tie system accomplishes this by inserting 16 to 20 independent supports under each 30 ft. of rail, and upon the track department is placed the impossible task of so adjusting these supports that each shall bear an equal part of the load. This is the real secret of the enormous amount of labor spent on surfacing a track in order to carry trains at high speed, and it is a work that goes on forever. Moreover, assuming a joint has not been kept up to surface, what happens when a wheel passes over it? Within certain limits the ends of the rail will deflect until the tie receives a firm bearing; and

same deflection the 80-lb. rail should have 20 per cent. more breakages than the 60-lb. rail, all other conditions being exactly the same. To be sure, this is only approximately true, but it goes to show that if the track could be made as smooth and unyielding as a planer table, an ideal condition would be realized. If this is true, then the railroads are wasting their money in buying heavier rails.

But the usual argument against an unyielding roadbed is offered by the railroad manager about as follows: "The track must be elastic, otherwise the rails would be destroyed or broken, and therefore the present form of track must be maintained." Yet this same manager will order the heaviest rails to be placed in the track, to be supported on the heaviest ties that he can procure, and laid on the deepest ballast, to make a firm and unyielding roadbed as near as can be made by such devices. If a rail could be laid on a solid bed uniform throughout its entire length, so that every part is supported exactly the same as every other part, where will the rail break?

But how shall a roadbed be built that will meet such conditions? In the first place, the substructure upon which it is to be laid must be absolutely unyielding, and its foundation must be free from all moisture, or below the action of frost. In some cases concrete walls must be built upon which the superstructure is to rest. In other cases piles must be driven, each case being treated as the conditions require. Upon this the superstructure must be laid. This must be some departure from the cross-tie laid on ballast. Nothing can be expected from any longitudinal support laid on ballast, for it can be shown that unless some transverse support is given to the longitudinals, it will be impossible to keep such a track in surface.

In the *Railroad Gazette* for March 15, 1907, there is an article by Mr. Gustav Lindenthal, M. Am. Soc. C. E., showing a form of steel longitudinal support for track rails (Fig. 2.) This shows a rock ballast under two longitudinals, covered by a sand or gravel filling. Think of putting down a bed of clean rock for ballast and then covering it with sand, as though the difficulty in keeping the ballast clean is not enough without mixing it with sand! Referring to the cross-section of the steel longitudinal system shown above, it will be seen that when the system is in place as the author shows, there will be a nice little prism of broken stone supporting

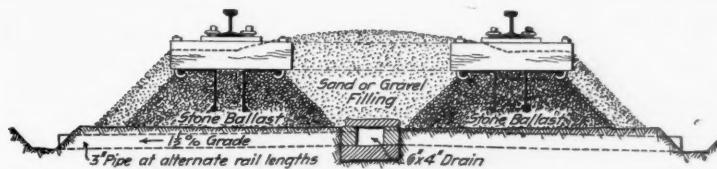


Fig. 2.

the steel girder upon which the rail is to rest. Now, when with a good deal of labor this broken stone is packed into just the right shape, why not put something into it that will keep it there, instead of having it jarred out of place by the traffic? This form of track is being tried experimentally by the Pennsylvania Railroad on the Philadelphia division and the experience they are having with it is exactly as should be expected. It is impossible to keep such a track in surface. The reason for this is not difficult to find. Just turn the cut showing the cross-section upside down, and if you assume the pressure on the ground as uniformly distributed you can at once realize the tendency of the prisms under the rails to flatten out, and this is exactly what takes place in this form of track to-day. The system of longitudinal support will never prevail unless combined with some transverse support.

But how can this be accomplished? Take the present form of track, with cross-ties sawed to dimensions and surfaced on one side to uniform thickness, laid on a rock ballast at least 16 in. deep. Insert steel I-beams *temporarily* under the ends of the ties, so that each tie will have a full bearing on the beam at each end (see Fig. 3). The steel beams are to be of the "Special" type with broad flanges rolled only by the Bethlehem Steel Company. The beams are to be tied together by tie rods spaced 2 ft. centers, so as to confine the ballast between the beams. On the ends of the ties previously laid place a bond timber notched over the ties at least 1 in. and hold the same down by means of a hook-bolt passing through the tie and anchored to the inside flanges of the beams. An angle-iron nosing on the inside of the bond timber serves as a guard rail. After all is in place, the extraneous ballast, that outside of the beams, is removed. No part of this operation need interfere with traffic. In bringing such a track to surface, the entire structure is to be lifted by means of track jacks placed under the flanges of the beams. After the ballast is once in place very little work should be necessary to keep such a track in surface. The ballast is confined between the beams, so that an arch action can

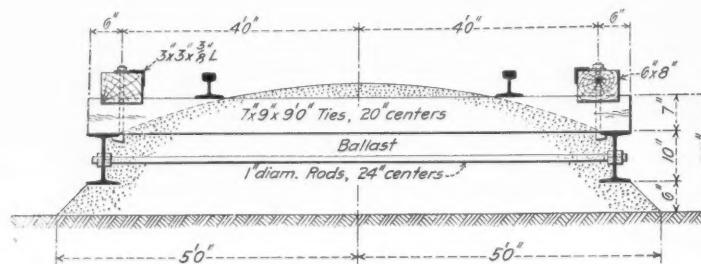


Fig. 3.

take place, with the thrust of the arch taken up by the tie-rods. This assumption makes it possible to find the tension on the rods and properly proportion them.

But, how does this form of track offer any advantage over the present form of track? Solely in the introduction of the longitudinal beams. These beams are to perform two distinct functions. First, the special beam, with a moment of inertia equal to five times that of an 80-lb. rail, and with 8 per cent. less metal, should do just five times the work done by the rail when both are working together under the same conditions, neglecting the work done between the cross-ties in either case. The work done by the rail would then be principally to distribute the load over the ties, and not to make up for the deficiencies in the substructure as it does now. Second, in confining the ballast, and thereby preventing the track structure from working its way down through the ballast as it does now in the present form of track, where under heavy traffic the ballast is kept in constant motion during the passage of trains, and the particles of the granular mass being free to move, they follow the line of least resistance, that is, out from under the ties. This explains why the ballast is so unstable and accounts for the enormous amount of labor necessary to keep a track in surface and alignment. With the proposed form of track, on a solid substructure, this should largely disappear. After this form of track has been proven by experiment to be correctly designed, the timber should be removed, and the ballast replaced by concrete flush with the tops of the beams, forming a permanent substructure upon which the superstructure is to be placed. At the same time the steel beams can be removed. This superstructure should be some form of longitudinal support bedded in concrete, so as to distribute the loads over large areas, offer perfect drainage and be absolutely imperishable and unyielding.

The authorities have directed that the best and most intelligent track hands on the Prussian State Railroads be organized into gangs whose special duty shall be to keep rail joints and switches in order. Badly drained joint ties, loose joint or switch ties, rails with differing levels at joints and all defects in frogs and switches are to be remedied as soon as discovered, and special efforts made to discover them as soon as they occur.

Production of Coal in 1906.

According to statistics compiled for the United States Geological Survey by Edward W. Parker, coal mining expert in charge, the total production of coal in the United States in 1906, was 414,039,581 short tons, valued at \$512,610,744, an increase of 5.4 per cent. in quantity, and 7.5 per cent. in value.

Of the total production in 1906, Pennsylvania contributed 200,546,084 short tons, or 48.4 per cent. in quantity, and \$262,182,935, or 51.1 per cent. in value, the larger percentage in the value being due, of course, to the higher value of anthracite, which is produced almost exclusively in that state. The anthracite production of Pennsylvania in 1906 was 63,645,010 long tons (or 71,282,411 short tons), valued at \$131,917,694, while the bituminous production was 129,263,673 short tons, valued at \$130,265,241. The anthracite production of Pennsylvania in 1906 was 5,694,142 long tons (or 6,377,439 short tons) less than that of 1905, with a decrease in value of \$9,961,306, while the bituminous production showed an increase of 10,850,036 short tons in quantity and of \$16,874,734 in value.

West Virginia has supplanted Illinois as the second coal producing state, showing a total output of 43,276,485 tons,* while the production of Illinois was 41,497,435 tons. This was due principally to the almost complete suspension of mining in Illinois (as in other states where labor union forces were strong) during all of April and a part of May, when the miners and operators were in conflict over the wage scale, whereas the majority of the operations in West Virginia were more actively worked, as a result of the suspension of work in the other districts. The West Virginia output increased from 37,791,580 tons in 1905 to 43,276,485 tons in 1906.

Notwithstanding the loss of from six to eight weeks in the states where mining operations were suspended, there was a general increase in production east of the Mississippi river, the only exception being in Michigan, Georgia and North Carolina. In Illinois, where the question of the wage scale is most sharply contested, the production increased from a total of 38,434,363 tons in 1905 to 41,497,435 tons in 1906. Indiana's production of coal increased from 11,895,252 tons in 1905 to 12,084,281 tons the following year. Ohio's production increased from 25,552,950 tons in 1905, to 27,729,843 tons in 1906, while the bituminous production of Pennsylvania increased from 118,413,637 tons in 1905 to 129,263,673 tons in 1906.

Among the other coal-producing states in which there was an increased production in 1906 were Alabama, Colorado, Iowa, Kentucky, Maryland, Montana, New Mexico, Tennessee, Virginia, Washington and Wyoming. In addition to the three states previously named in which decreases occurred, the following showed losses in tonnage: Arkansas, Indian Territory, Kansas, Michigan, Missouri, Texas, California, Oregon and Alaska. In California, Oregon, Arkansas, Indian Territory and Texas the decreases were due principally to the use of fuel oil.

Production of Coal in 1906, by States.

State.	Production.	Value.	State.	Production.	Value.
Alabama ..	13,107,663	\$17,467,886	New Mex...	1,963,558	\$2,635,571
Arkansas ..	1,864,518	2,999,774	North Dak.	300,998	437,894
Cal. & Alask.	30,831	78,684	Ohio	27,729,843	30,386,297
Colorado ..	10,114,074	12,738,503	Oregon	79,731	212,338
Ga. and N.C.	363,463	407,247	Pennsylvania :		
Idaho & Nev	6,165	24,238	Anthracite	71,282,411	131,917,694
Illinois ...	41,497,435	44,742,440	Bituminous	129,263,673	130,265,241
Indiana ...	12,084,281	13,105,168	Tennessee ..	6,262,686	7,682,121
Ind. Ter ..	2,859,450	5,481,953	Texas	1,160,707	2,058,731
Iowa	7,321,639	11,688,595	Utah	1,773,847	2,411,992
Kansas ...	6,010,858	8,935,195	Virginia ..	4,275,815	4,207,521
Kentucky ..	9,673,536	9,794,823	Washington ..	3,276,184	5,908,434
Maryland ..	5,434,528	6,473,829	W. Virginia.	43,276,485	40,777,382
Michigan ..	1,336,338	2,402,529	Wyoming ..	6,138,152	8,019,486
Missouri ..	3,755,778	6,163,449	Total	414,039,581	\$512,610,744
Montana ..	1,787,934	3,186,620			

The Salving of the "Suevic."

BY A. G. HOOD,
Editor of *The Shipbuilder*.

The salving of the White Star liner "Suevic," although not altogether unique, represents one of the most difficult engineering feats accomplished in recent years, and the success which has crowned the operations has created world-wide interest.

It will be remembered that on the night of the 17th of March last the "Suevic," a fine twin-screw vessel 550 ft. long and 12,500 tons gross register, struck a reef of submerged rocks about a quarter of a mile off the Lizard Point, Cornwall. Although a heavy sea was running at the time of the mishap all the passengers were safely removed from the ship without any loss of life.

From the beginning it was apparent that it would be impossible to save the whole ship. The fore end, for a length of about 150 ft., was badly pierced and firmly wedged on the rocks. At high water, the after portion, representing about 400 ft. of the vessel's total length, floated free. At low water, however, this after part rested heavily about amidships on two sharp projecting rocks, which, with the motion given to the vessel by the waves, threatened to pierce the bottom. The first duty, therefore, in order to prevent further damage, was to remove these rocks. Divers descended; with the

*This and following figures all in short tons.



Fig. 1—The "Suevic" at Low Tide Shortly After Stranding.

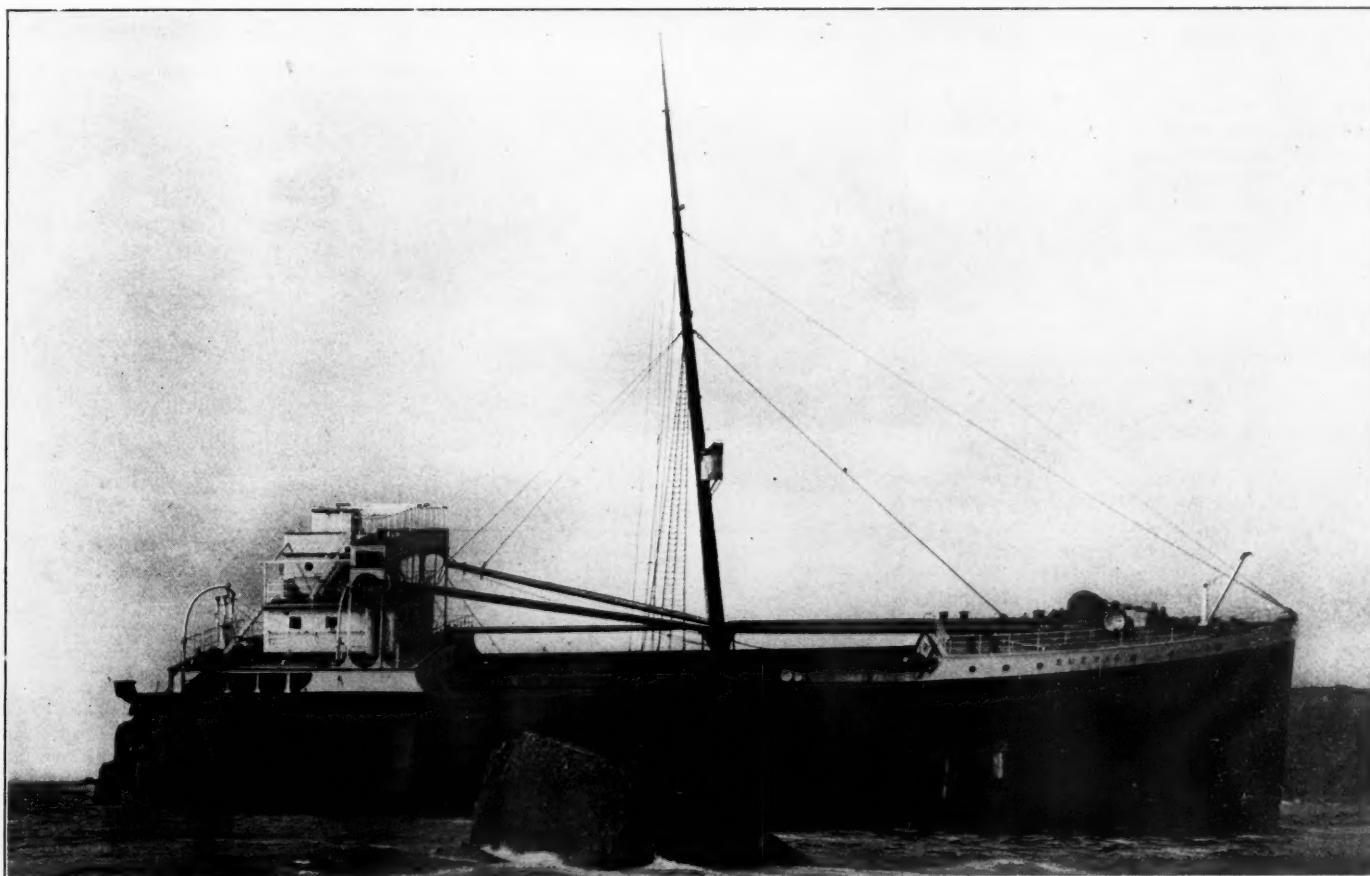


Fig. 2—Bow of the "Suevic" Left on the Rocks.

aid of pneumatic tools holes were drilled, and the pinnacles were removed by blasting.

Preparations were then made to cut the vessel in two about 180 ft. from the stem, and thus save about two-thirds of the ship, containing the valuable twin-screw propelling machinery and the passenger accommodation. The severance was to be made forward of the second mast, about the middle of No. 3 hold. This hold, which was insulated for cold storage and filled with carcasses of mutton, had been flooded. Owing to the ship being loaded, the

Association, under the direction of Captain McClellan, on the "no cure no pay" basis. Captain Murray superintended the work on behalf of the White Star Line. The Liverpool Salvage Association and the owners' officials are to be congratulated on the successful termination of their courageous efforts, which have resulted in the saving from destruction of the greater portion of a costly vessel.

Messrs. Harland & Wolff, the famous Belfast shipbuilders, by whom the "Suevic" was built in 1900, have now under construction a facsimile of the fore part of the vessel left behind near the Lizard. This will be launched in the same manner adopted with a complete hull, flotation being secured when the portion leaves the stocks by the aftermost transverse bulkhead. The new fore end will then be towed to Southampton, where the work of joining it to the salved portion will be carried out in dry dock. The principal dimensions, lines and tonnage of the reconstructed "Suevic" will be similar to those of the vessel before the accident, and great care will be taken to ensure the complete homogeneity of the united structure, so that when the liner is again put into commission she will be as stout and strong as any new steamship just leaving the hands of her builders.

As already stated, the idea of cutting a stranded vessel in two, in order to save part of the structure, is not new. The first ship so treated was the "Milwaukee," of 7,317 tons, now owned by the Canadian Pacific Railway Company, which ran ashore off the Aberdeen coast in the late autumn of 1898. As in the case of the "Suevic," the after part of the ship containing the propelling machinery was saved and towed to the River Tyne, where a new fore end was constructed, launched and fitted by methods generally similar to those being adopted for the reconstruction of the "Suevic." The fourth illustration is not a photographic trick, as one might well imagine on glancing at it, but an actual photograph of the new fore end and the old after end of the "Milwaukee" lying along-

Fig. 3—After End of the "Suevic" in Dry Dock at Southampton.

divers had to work from the outside of the hull, and the conditions of working were rendered extremely difficult by a strong spring tide race under the vessel's bottom. The whole of the cutting process was accomplished by exploding gelignite cartridges, no drilling being attempted. As the work of blasting proceeded, the carcasses of mutton constituting the cargo were liberated, and these, as may be imagined, were a source of considerable inconvenience to the men. On account of the heavy seas, work under water was not continuous, but during the periods of inaction below water progress was made with the cutting of the side plating above the water level and the deck plating. As the gap in the ship increased, the after portion began rolling independently of the fore part, and in conducting the blasting operations the men were in considerable danger.

Towards the completion of the severance, careful preparations to haul off the after end were made. Precautions were also taken to prevent the salved portion being driven end on to the fore part, or swung round by the sea or current. The engines of the vessel were kept under steam continuously for 24 hours previous to the completion of the cutting process, and heavy anchors were laid out astern with steel wire hawsers kept taut by the vessel's winches. In all, five anchors were used. Everything having been got ready, two tugs and one of the salvage steamers, aided by the vessel's engines and winches, were successful in towing off the after end of the ship April 2d, the herculean task of cutting the vessel in two having only occupied six days. The flotation of the after end was assured by the transverse watertight bulkhead dividing No. 3 hold (through which, as already explained, the severance was made) and No. 4 hold. The after end, floating on an even keel, was got under way, and, under its own steam and guided by three tugs, proceeded stern first up the English channel. Southampton was safely reached on April 4th, and the wreck berthed at the Test Quay, where it proved an object of interest to thousands of spectators. Much of the machinery on the abandoned fore part of the "Suevic" was also recovered, including the refrigerating plant.

The salving operations were performed by the Liverpool Salvage

side each other at Wallsend-on-Tyne, before being joined together in dry dock. This feat, which attracted much attention at the time, was performed by Messrs. Swan, Hunter & Wigham Richardson, the original builders of the vessel.

The accident to the British torpedo-boat destroyer "Syren," which stranded during naval manoeuvres in 1905, also necessitated the abandonment of the fore end of the vessel. Messrs. Palmers,

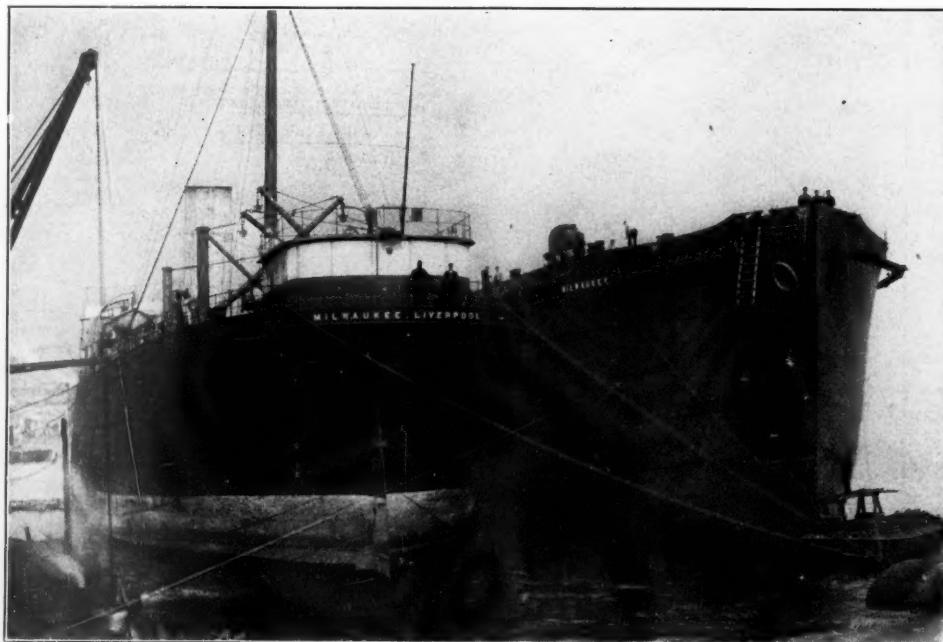


Fig. 4—The Bow and Stern of the "Milwaukee."

of Jarrow-on-Tyne, were responsible for the construction of the new portion, which was successfully joined to the salved after end. Very similar operations were performed in the case of the "Highland Fling," a vessel of 3,822 tons, which stranded off the Cornish coast a few months ago. The work at the "Suevic," however, constitutes the greatest of these interesting salvage feats owing to the size of the vessel and the difficulties under which the operations were conducted.

GENERAL NEWS SECTION

NOTES.

A reciprocal demurrage law is now in force in the state of Washington.

General William J. Palmer has given to the Engineering School of Colorado College, Colorado Springs, the sum of \$12,000 to be used for additional equipment of the engineering laboratories.

The Texas Central has notified the State Railroad Commission of Texas that it will run sleeping cars of its own between Waco and Rotan, 286 miles, and that the rates for berths will be \$1.50 lower and \$1.00 upper.

On July 1 the American Express Co. is to supersede the United States Express on the lines of the Lake Shore & Michigan Southern west of Cleveland; and on August 1 the same change will take place on the Lake Erie & Western.

At Chicago June 20 the United States District Attorney, acting in behalf of the Interstate Commerce Commission, filed a suit against the Chicago, Indianapolis & Louisville to enjoin the road from exchanging passenger transportation for advertising in a magazine.

The Southern Pacific, the San Pedro, Los Angeles & Salt Lake, and the Nevada-California-Oregon railroads have brought suit in the United States District Court at Carson, Nev., enjoining the enforcement of the reduced rates ordered by the legislature of Nevada at its last session.

It is announced in Topeka that the railroad commissioners of Kansas are to order a general reduction of passenger fares in the state to 2 cents a mile. At present this rate is required in that state only in the case of mileage books. It is said that the railroads probably will not object to making the rate general and thus getting rid of the mileage books.

A press despatch from Washington June 24 reported that in a sleeping car arriving in that city that morning on the Pennsylvania Railroad every passenger's clothes and baggage had been rifled and all of the money taken therefrom, some of the men's garments being found afterward in the smoking car. The thieves seem to have escaped without discovery.

The New York 16-hour law, applying to railroad employees connected with the movement of trains in the state, the passage of which was reported last week, goes into effect March 4, 1908, the same date on which the similar Federal law goes into effect. The New York law does not apply to railroads under 30 miles long. The penalty for disobedience is a fine of \$500 to \$1,000.

The New England Gas & Coke Co., of Boston, is having built three new steam vessels to bring coal to its gas works at East Everett, near Boston, and announces that within a few months, or as soon as these vessels are finished, the company will sell bituminous coal to manufacturers on the lines of the Boston & Maine Railroad at prices decidedly lower than those now prevailing.

The Governor of Pennsylvania has approved an appropriation bill granting to the new railroad commission of that state for expenses for the next two years \$150,000. The state has appropriated \$200,000 for the improvement of the Delaware river front at Philadelphia and the deepening of the channel; \$1,000,000 for highways, which doubles the amount available for that purpose in the state, and \$500,000 for the purchase of forest lands.

At Hornell, N. Y., this week, it was stated that the Erie Railroad has been paying the International Association of Machinists \$10,000 a year to keep the association from ordering a strike of the machinists in the railroad company's shops. This statement is given on the authority of General Manager Stuart, who is reported as saying that the received vouchers for the sums paid to the representatives of the association in order to keep the peace can be seen at the headquarters of the road in New York City.

At New York City last week Mr. Decker, Agent of the Interstate Commerce Commission, heard testimony in the complaint of the Commissioner of Immigration at New York City, Mr. Watchorn, concerning passenger fares charged to immigrants from Europe on railroads running out of New York. It appears that to Philadelphia and some other short-distance points the rate for immigrants riding in the ancient cars of immigrant trains is about the same as regular first-class fare, the former difference between the classes having been obliterated by the recent reduction in the first-class rate.

Early last Saturday afternoon a section of the New York Central's feed wire and transmission cables near 126th street was burnt out. The trouble was started by a short circuit in the feed wire cables which deliver current from the transforming stations to

the third rail. The cables at this point are carried on top of the east girders of the viaduct. When the current was short circuited to the iron pipes which carry the cables, the metal was fused and the heat melted the pipes carrying the higher tension transmission cables, so that they also were short circuited. Before the current was turned off the blaze had spread over nearly two blocks, iron pipes, cables and even parts of the girders being melted.

M. N. Forney Is Married.

Under the many banterings which Mr. Forney has had from his friends concerning his rather prolonged celibacy, he has never said that he intended to remain a bachelor. A letter received from him last week begins as follows: "There is something of very grave import in my mind, which it is the purpose of this letter to communicate to you. It is that I have come here to Baltimore to be married, and it is expected and intended that the event will take place next week." The bride is Mrs. Annie V. Spear, of Baltimore, a friend of many years, and with all friends of Mr. Forney we join in hoping and believing that he is now achieving that happiness which he so fully deserves.

Colorado Railroad Commissioners.

The Governor of Colorado has announced the appointments of the three members of the new state railroad commission; the last commission went out of existence 20 years ago. The members are: Frederick J. Chamberlin, Denver, Managing Director of the Investment Securities Company, London; Halsted L. Ritter, of the law firm of Bonyng & Ritter, Denver, and Bulkeley Wells, formerly Adjutant-General of Colorado.

Disastrous Collisions at Hartford and Pittsford.

In a butting collision between a westbound passenger train and an eastbound train near Hartford, Conn., on the Highland division of the New York, New Haven & Hartford, last Sunday afternoon, eight laborers on the work train were killed and 35 or more injured, the victims being in a car at the head of the train, which was being propelled by an engine at the rear. One of the two main tracks at this point had been given up to the work train until a certain hour on Sunday evening, and it appears that the collision was due to some misunderstanding or misinterpretation of orders as to when the right of the work train expired.

In a butting collision between a passenger and a freight train on the single track line of the New York Central at Pittsford, N. Y., on the same day as the above, four passengers and one other person were killed and a dozen or more were injured.

Merits on the Atchison.

The Santa Fe Employees' Magazine continues to publish each month a list of the merit marks recorded on employees' records, and in the June issue has 2½ pages filled in this way. We have not the space for extended extracts, but we reprint the notes of a half dozen cases in which the reasons for granting the merit marks were somewhat unusual.

W. J. Russell, check clerk, five, for detecting error in routing on waybill and correcting it so as to give the company the long haul.

Conductor F. J. Thomas, Brakeman J. K. La Prade and M. M. Penrod, Engineer L. Morrison and Fireman Henslect, Albuquerque division, 20 each, for bringing to life engine that had broken blow-off cock. They took broken parts to private shop for repairs, borrowed a hose from the city fire department, refilled engine, fired up and brought their train forward.

J. S. Harlan, conductor, 15, for handling stock train in an emergency without brakemen, and putting in two brasses on the trip, thus avoiding a serious delay and claims.

W. G. Atkinson, engineer, and F. G. Viets, fireman, 10 each, for interest shown in thoroughly cleaning engine 221 which was selected for the Kansas City Commercial Club special.

A. C. Bentz, brakeman, 20, for excellent service in cutting wire and reporting accident to train No. 8 at Symons, May 3. His prompt action made it possible to get assistance, start wrecker and reduce delay to train.

C. E. Baker and W. W. McLarney, conductors, 10 each, for interest and energy displayed in repairing a Lidgerwood ballast unloader and getting it into shape for service during the night, so that it was ready for use the following morning.

John G. Miller, engineer, 15, for prompt and energetic action upon discovery that switch was set wrong. A very serious derail-

ment to No. 10 was thus avoided and although the sun was full in his face, obscuring his vision, he discovered that the switch was wrong in time to stop his train.

C. W. Young, conductor, Western division, 10, for interest displayed in securing engine. Engine and telegraph failed but he used a roundabout long-distance telephone.

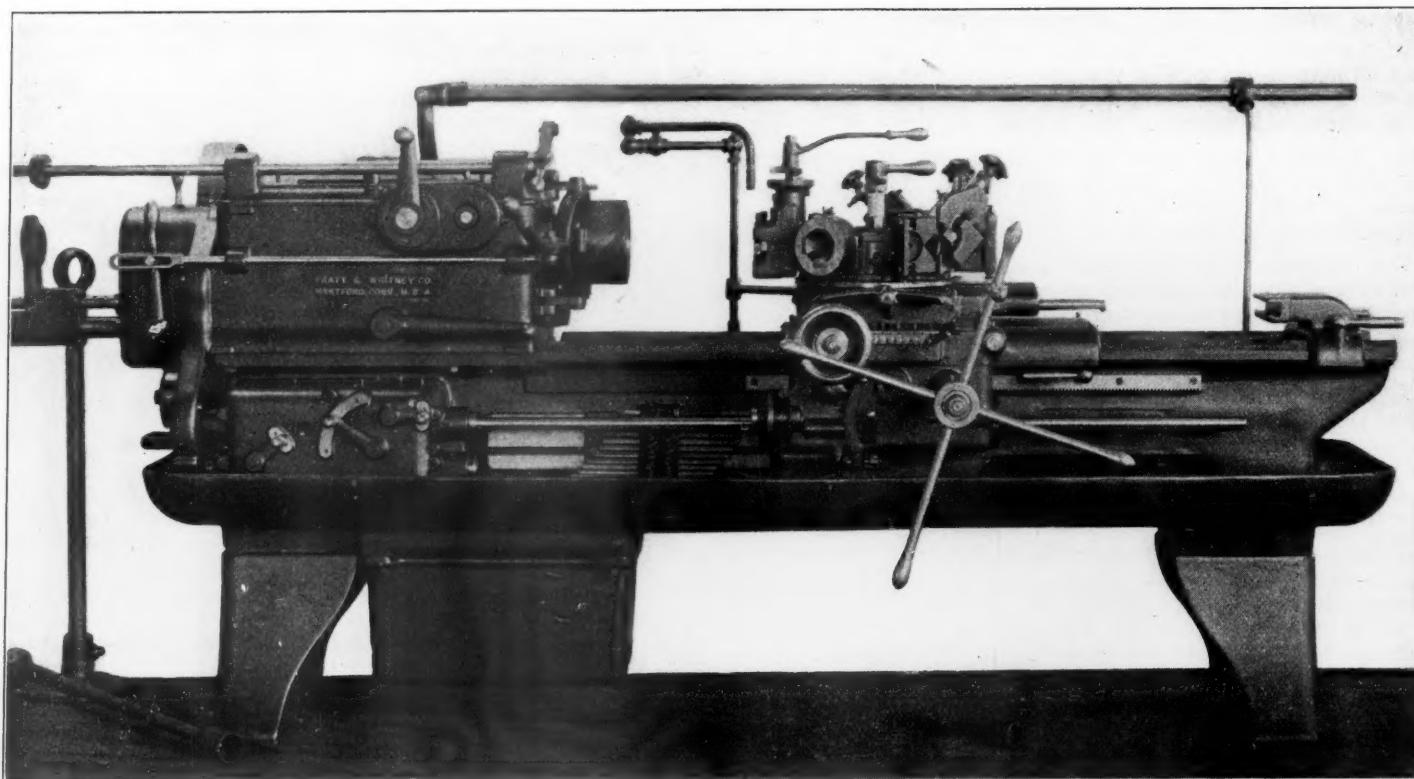
A New Open Turret Lathe.

The new Pratt & Whitney 2½ in. x 26 in. open turret lathe, shown in the accompanying photographs, is a universal machine suited to a great variety of work on bar material and forgings and castings, without continually requiring special appliances and expensive cutting tools. The machine has the flexibility and adaptability of an engine lathe. The rigidity, powerful spindle drive, quick

conveniently as long bars and keeps such pieces concentric with the spindle. A stock stop for gaging the length of stock is provided, which, when not in use, is moved forward and swung upward, so as not to interfere with the turret tools. The turret revolves about a large conical stud held firmly in the cross slide.

The tools can be set accurately with rigid backing, so that the heaviest cuts can be taken without spring or backward movement. The tools are held in place by straps and are backed up by uprights cast solid with the turret. The locking bolt is directly under the cutting tool and is horizontal, so that it does not have the tendency of a vertical bolt to lift the turret from its seat.

Indexing can be done at all positions of the cross-slide; it is automatic, although the turret may be rotated to any position by hand. One of the most important features is the compound turret with power and hand feeds and adjustable stops conveniently lo-



Pratt & Whitney Open Turret Lathe.

changes of speeds and feeds, heavy cross feeding turret and numerous adjustable stops make the limits of error narrower and reduce the cost of work as compared with the ordinary turret or engine lathe.

It has a stiff head, with constant speed arranged for either direct-connected motor or countershaft drive by a single pulley. The turret is mounted on a slide, having both longitudinal and traverse movement driven by power or hand. The machine is recommended for bar work up to 2½ in. x 26 in., for castings up to 14 in. diameter, and for cylindrical operations on work within these dimensions. An unusually heavy spindle of special steel, with cylindrical bearings, runs in bronze split sleeves. The thrust of the spindle is against an independent upright, cast solid with the head, preventing any springing tendency under heavy end cutting strains. Provision is made for taking up wear of spindle and end thrust.

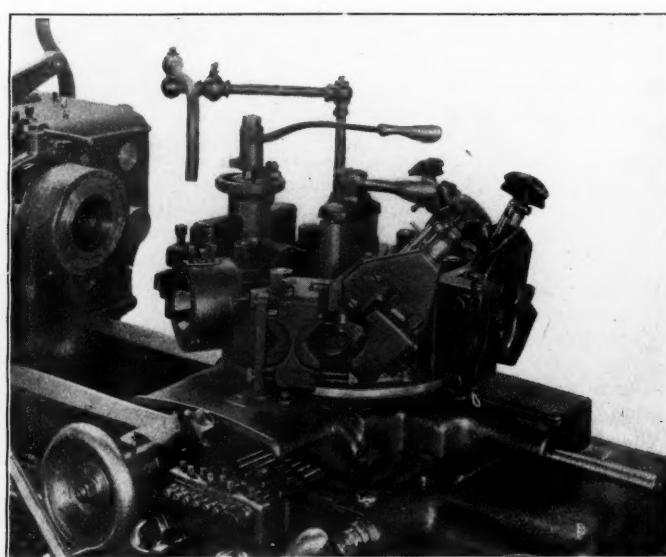
The relation of the spindle to the work is governed by levers operating friction clutches. It is impossible to connect more than one set of gears with the spindle and main driving shaft at the same time. The gears are wide and of extra heavy pitch; they run in oil. The head, which is stationary, is of box construction. Eight speeds are provided, and by using the two-speed countershaft this range may be doubled. All the controlling levers and connections are within easy reach of the operator. The spindle can be instantly stopped by the movement of any lever on the head stock.

The rod chuck may be operated while the machine is running. The collet jaws are supported up to their outer end, which is particularly desirable in forming work from the cross slide. The complete chuck can be readily removed from the spindle when combination lathe chucks or special face plates for castings are to be substituted. A positive screw feeding device automatically feeds the rod forward to its stop. The bar may be round, square, hexagon or any irregular cross section, and need not necessarily be free from scale, as there are no delicate parts or complicated gearing to become clogged.

The follower bar allows short pieces of stock to be handled as

cated. The longitudinal turret slide travels on large raised "V's." It is provided with gibbs its full length, and has a binder by which the slide can be firmly clamped to the bed at any point within its travel. The power longitudinal feed is positive in both directions, and has six changes, any of which can be instantly set by a lever movement.

There are six automatic longitudinal stops and six supplementary stops, which give two positions to each turret tool. If necessary, all 12 stops may be used for one or all tools in the turret, making it possible to effectively cover all requirements. The stops



Turret of Pratt & Whitney Lathe.

are held in a heavy steel bracket, which may be moved along the front of the bed and clamped where wanted. In case it is desired to run through a few special pieces of work, the automatic stops may be dispensed with and the supplementary stops used in their place without disturbing adjustments.

The distance from the axis of the spindle to the turret tool is altered by traversing the turret slide. This arrangement permits ample support for long bars and, if the machine is belt-driven, gives an unvarying belt tension. A motor can be mounted on the head without difficulty. The cross slide has both hand and power feed. There are six variations of the power feed in either direction. Eight distinct adjustable cross stops are provided, which may be used in any combination desired.

Bed and pan are made in one single casting and have "U" shaped cross webbing, insuring rigidity. There is plenty of room for oil and chips. Turret tools adapted to all usual requirements are furnished to order. The Niles-Bement-Pond Co., New York, is about to put this machine on the market.

Sir Thomas Shaughnessy Knighted by Japan.

Prince Fushimi, of Japan, has conferred on Sir Thomas Shaughnessy, President of the Canadian Pacific, the honor of second class of the Order of the Sacred Treasure, which is Japan's highest knighthood.

New Railroad Commission for Michigan.

The legislature of Michigan, on June 19, passed a bill providing for a railroad commission of three members, taking the place of the present single commissioner. The law also provides for reciprocal demurrage, and the commission is empowered to regulate freight rates. It may also require steam and electric railroads to deliver cars of freight to each other.

Stockholders, not Shippers, Are Oppressed.

I have no hesitancy in saying that no railroad fortune was ever made through enhancing rates, oppressing shippers, or notwithstanding the general tendency of rates to decrease. And what is more, every dishonest railroad fortune has been made, not by oppressing shippers, but through robbing the stockholders.—*Stuyvesant Fish*.

Medals for Railroad Heroism.

Railroad life saving medals have been awarded to Charles Arms, of Clarksville, Tenn., and Edgar E. George, of Parsons, Pa. Mr. Arms saved the lives of two mail clerks and a baggageman, who were in the wreck of Louisville & Nashville train 102, at Clarksville, Tenn., on September 29, 1906. The train ran through the open draw of the bridge over the Cumberland river, and the locomotive, mail and baggage cars dropped to the river 50 feet below. It was about 8 o'clock at night and dark. The river was in flood and full of driftwood. When the train fell into the river the two mail clerks and the baggageman, although terribly bruised and shaken, managed to break their way out of the cars and get on top, where they clung with all their remaining strength, shouting for aid, while the partly submerged cars were being rapidly swept down the river by the swift current. A number of persons were standing on the river bank when the accident happened; they saw the cars plunge into the river and heard the despairing cries of the mail clerks and baggageman for help, but did not go to their aid. At the time of the accident, Arms, who lives near, was in bed with malarial fever. He had been sick nearly four weeks. He heard the crash of the train as it fell. He immediately arose, and without waiting to fully clothe himself, made his way as rapidly as possible to the ferry landing. Here he jumped into a skiff and appealed to the bystanders for aid, offering \$10, all the money he had, to any one who would go with him. No one would. In spite of attempts to dissuade him, Arms pushed off in the boat alone, and with cries of encouragement to the imperiled men, finally reached the cars and succeeded in taking them off and safely bringing them to shore. The medal was sent with an autograph letter of transmittal from President Roosevelt.

Edgar E. George saved the life of a Polish boy, whose foot had become fastened in a frog on the Delaware & Hudson track at Parsons, Pa. George and a number of other persons were on the station platform awaiting the approach of a fast passenger train when the screams of the lad attracted their attention. George immediately ran to the boy, hoping to extricate him. He made unsuccessful attempts to release the foot, and finding it impossible to do so before the train reached him, he seized the boy's body and, bending it down outside the rail, forced the imprisoned leg under the engine cylinders, oil boxes and car steps, which scraped the bodies of the two as the train passed. The engineer applied the emergency brake, but did not succeed in stopping until the locomotive and one car had passed over Mr. George and the boy. Mr. George's right

hand was slightly cut and bruised. Beyond a badly strained foot and leg the boy was uninjured. Under the circumstances it was something of a miracle that both were not killed.

INTERSTATE COMMERCE COMMISSION RULINGS.

In an opinion by Commissioner Lane, the case of Rau vs. the Pennsylvania and other roads is decided. The complainant ships bags from Newark, N. J., to Stanley, Luray and Greenville, Va., over the Pennsylvania, Cumberland Valley and Norfolk & Western roads, which are used in shipments of ground bark from Virginia to Newark, and on the bags 38 cents per 100 lbs. is charged, while on complainant's competitors' bags from Newark to Barboursville and Charlottesville, Va., via the Pennsylvania and Southern roads, a rate of 22 cents is in force, such difference in rates resulting from the use of different freight classifications. The Commission holds that the rate on bags from Newark to Stanley, Luray and Greenville should not exceed 22 cents.

Preference Given to Company's Truckmen.

In an opinion by Chairman Knapp, the Commission has decided the case of New York Team Owners' Association vs. Southern Pacific. The defendant employs a particular trucking firm to transport through shipments from railroad depots in and about New York City to its pier No. 25, in New York, and gives preference at the pier to the through traffic transferred by such trucking firm over traffic originating in New York and vicinity brought to the pier by other trucking firms. The pier is inadequate for the business and congestion and delay result. The pier is not closed at night until all waiting trucks are unloaded, and it is soon to be considerably enlarged. No instance of injury resulting to shippers or their traffic and no discrimination amounting to exclusion from the pier was shown. The Commission holds that such preference does not operate unduly or unreasonably against other truck owners, members of the complaining association.

TRADE CATALOGUES.

Mine and Quarry.—The current number of this quarterly magazine of the Sullivan Machinery Co., Chicago, is the first of Vol. II. It contains six interesting articles. The first, "The Panama Canal in April, 1907," was written especially for the magazine and treats the subject from the standpoint of its particular field. "Western Methods of Tunnel Driving," likewise written especially for this magazine, describes the methods used on the Ophelia tunnel in the Cripple Creek district of Colorado. Other articles are, "Economy in Quarrying Slate"; "Coal Mining at Bicknell, Ind.," a long, well-illustrated article giving the methods used by several of the big companies, which employ Sullivan devices; and "Mineral Prospecting at Cobalt." All the articles are illustrated.

Reinforced Concrete.—Part II. of "Trussed Concrete Illustrated" of the Trussed Concrete Steel Co., Detroit, Mich., Part I. of which has previously been noticed in these columns, illustrates the Kahn system of reinforced concrete as applied to mills and factories. It is prefaced by a brief discussion on essentials, first cost, maintenance, speed of erection, adaptability, etc., and the remaining thirty-odd pages show views of various mill and factory buildings built or under construction on this system, with a brief description. Trussed Concrete Bulletin No. 5, of this same company, is entitled "What Reinforced Concrete Is," the subject being discussed with particular reference to the principles and advantages of the Kahn trussed bar.

Burlington Convention Tours.—The Chicago, Burlington & Quincy, in connection with the other connecting roads concerned, has issued two folders showing the itinerary of two convention tours. One of these meetings is the annual convention of the Baptist Young People's Union of America at Spokane, Wash., July 4 to 7; the other, the convention of the National Educational Association at Los Angeles, Cal., July 8 to 12. The Burlington has been selected as the official route to these conventions by certain Chicago organizations. The photographs of scenes along the routes to these two western points are unusually successful.

Cranes and Foundry Equipment.—The Whiting Foundry Equipment Co., Harvey, Ill., has issued circular No. 76, "just to remind you" of some things the company does. The booklet indicates briefly the line of cranes and foundry equipment made, references being given in each instance to a more complete catalogue describing the device fully.

Velox Bronze.—A "reminder" sent by A. Gilbert & Sons Brass Foundry Co., St. Louis, Mo., calls attention to "Velox" bronze as a wearing metal for wearing parts of locomotives, cars, electric generators, etc.; also to the babbitt metal made by the company.

MANUFACTURING AND BUSINESS.

The report that the Evans & Howard Fire Brick Company, St. Louis, is concerned in a merger of St. Louis fire clay interests is without foundation.

The Passaic Steel Company, Passaic, N. J., has decided to stop making steel because of the high price of pig iron. The work of the mills is to be confined to bridge material and structural steel shapes.

William D. Ennis, who for the last two years has been making special investigations for the American Locomotive Company, New York, has been appointed Professor of Mechanical Engineering in the Polytechnic Institute of Brooklyn.

The Cleveland office of the Crocker-Wheeler Company, Ampere, N. J., has opened a sub-office in the Columbus Savings & Trust Co. building, Columbus, Ohio. The sub-office will be in charge of Charles W. Cross, formerly in the Cleveland office.

The Cutler-Hammer Manufacturing Company, Milwaukee, makers of electric motor controlling devices, has bought the Wirt Electric Company, Philadelphia, and will continue the making of battery charging rheostats, field rheostats and other apparatus heretofore made by the Wirt company.

The Bethlehem Steel Company has sold \$2,500,000 6 per cent. 5-year notes guaranteed by the Bethlehem Steel Corporation, of which the first named company is a subsidiary. The proceeds of the notes will be used to pay for the completion of the new rail and structural steel plant being built at South Bethlehem, Pa.

The Northern Engineering Works, crane builders, Detroit, Mich., have recently shipped the following cranes for power station service: a 24-ton, 62-ft. span, for the Buffalo & Susquehanna Coal Mining Co., at Sagamore, Pa.; a 6-ton, 36 ft. span, for the Winchester & Washington City Railway, and a 5-ton 36-ft. span, for the Watertown Electric Light Co.

The Stone & Webster Engineering Corporation has recently ordered new equipment for the Pawtucket Electric Co., including four 520-h.p. B. & W. boilers equipped with Foster superheaters for 150 deg. superheat. The Virginia Passenger & Power Company, of Richmond, Va., has recently ordered some Allis-Chalmers turbines and B. & W. boilers equipped with Foster superheaters for 175 deg.

During the last two years the Allis-Chalmers Co., Milwaukee, has contracted to equip six electric traction lines, aggregating 318 miles of track, of which 150 miles is now finished and in daily operation. These six roads are: The Toledo, Port Clinton & Lakeside, the Cincinnati, Milford & Loveland Traction, the Winona Interurban, the Indianapolis, New Castle & Toledo, the Indianapolis, Crawfordsville & Western, and the Milwaukee Northern.

The Chicago Railway Equipment Company, Fortieth street and Princeton avenue, Chicago, has bought from the Chicago Junction Railway Company over 20 acres of land, bounded by Forty-fourth, Forty-sixth, Lincoln and Robey streets, with a portion extending west of Robey street. The ground has 600 ft. frontage on Forty-sixth street and 1,300 ft. on Lincoln street. The property cost about \$200,000. A new plant is to be built here, on which probably \$500,000 will be spent during the year.

H. A. McMoore, formerly with the Harlem Contracting Company, New York, has gone to the General Fireproofing Company, Youngstown, Ohio. Mr. McMoore will be in the reinforced concrete department, in particular charge of designing and estimating work in which the company's system is to be installed. A. A. Lane, who has been with the Taylor-Wilson Manufacturing Co., Pittsburg, for several years, will be office manager of the reinforced concrete department of the General Fireproofing Co.

Iron and Steel.

Negotiations are pending for light rails for electric lines in Cleveland aggregating about 8,000 tons.

The Harriman Lines are in the market for about 16,000 tons of rails for use on the Salt Lake extension.

The Cincinnati, Hamilton & Dayton has ordered 4,000 tons of rails from the Lackawanna Steel Company.

The Atchison, Topeka & Santa Fe has ordered 15,000 tons of rails from the Lackawanna Steel Company.

The Great Northern and the Northern Pacific have asked bids for about 21,000 tons of structural material for bridges.

The Bradley Contracting Co., which has the contracts for building part of the subway loop in the Borough of Manhattan, has ordered 4,000 tons of fabricated shapes from the American Bridge Company and 1,000 tons from Snare & Triest. The Carnegie Steel Company has an order for 5,000 tons of steel bars for the same work.

OBITUARY NOTICES.

M. H. Burkhalter, Superintendent of the McCloud River Railroad, died recently of heart failure while on a trip in the mountains.

William Findlay Shunk died on June 22 at his home near Harrisburg, Pa. Mr. Shunk was born at Harrisburg in 1830. After leaving Dickenson College he went into the United States Navy as a midshipman in 1846. After four years he left the Navy and began railroad work on the Pennsylvania in 1856. He was Assistant to the Engineer of the Lewisburg Center & Spruce Creek, now a part of the Pennsylvania; he was later for some years a clerk in the State Department, and also worked on Government surveys. Mr. Shunk's work from this time on was in connection with railroad construction. He was for a year Assistant Engineer of the Duchess & Columbia, now part of the Central New England, and then became Chief Engineer of the Connecticut Western, another Central New England line. In 1874 he was appointed Chief Engineer of the Six Elevated Railroad, serving in this position during an important period of the construction of the road, which is now part of the Metropolitan Railway. He was afterwards made Chief Engineer of the latter company, and in 1882 left to build the Southern Pennsylvania, now part of the Cumberland Valley. In 1887 he was appointed Chief Engineer of the Kings County Elevated in Brooklyn, the building of which he finished. He resigned in 1889, and in 1890 took charge of the survey of the Pan-American Railroad. The last railroad work which Mr. Shunk did was the building of the Guayaquil & Quito, of which he was Chief Engineer. He retired in 1902, and had since lived at Harrisburg. Mr. Shunk was the author of two well-known handbooks on Curves and Engineering.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

Freight Claim Association.

At the annual meeting of this association in Denver, Col., June 20, 21 and 22, R. C. Richards, of the Chicago & North-Western, Chicago, Ill., was chosen President for the ensuing year. Next year's meeting will be held at Atlantic City, N. J., in the month of May.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Chesapeake & Ohio.—T. P. Fowler, President of the New York, Ontario & Western, and W. G. Oakman, Vice-President of the Interborough Rapid Transit Company, New York, have been elected Directors of the Chesapeake & Ohio, succeeding W. H. Newman and C. M. Depew of the New York Central & Hudson River.

Corvallis & Eastern.—J. P. O'Brien, Vice-President and General Manager of the O. R. R. & N., has been elected also President of the C. & E.; G. W. Talbot, General Manager and Treasurer of the C. & E., has been elected Vice-President and General Manager, and H. F. Connor, Secretary.

Interborough Rapid Transit Company.—See Chesapeake & Ohio.

Mexican Central.—John Albert Naugle, who was recently appointed Assistant to Vice-President Hudson, was born at Canton, Ind., in 1855. After a common school education, he began railroad work in 1869 as a newsboy on the Indianapolis & Vincennes, now part of the Vandalia. He learned telegraphy at Mooresville, Ind., and in three years was made agent and operator. After acting as agent at different places on several roads, he went to the Mexican International in 1884 as General Freight and Passenger Agent and Trainmaster. He was out of railroad work from 1888 to 1890, and then was appointed General Freight and Passenger Agent of the Sonora Railway and of the New Mexico & Arizona.

In 1894 he was appointed also Assistant General Manager of both roads, where he remained until he took his present position with the Mexican Central a few weeks ago.



John A. Naugle.

New York Central & Hudson River.—See *Chesapeake & Ohio*.

New York, Ontario & Western.—See *Chesapeake & Ohio*.

Norfolk & Western.—Nicholas D. Maher, who will on July 1 become Second Vice-President and General Manager, was born in 1854 at Blairstown, Pa. He was educated at Mount St. Mary's College, and began railroad work in 1871 on construction and survey on the Virginia & Charleston. After two years he went into the office of Superintendent of Transportation of the Pennsylvania as a clerk, and the next year was made clerk in the General Superintendent's office. In 1883 he went to the Norfolk & Western as chief clerk to the General Manager. He was made Trainmaster of the Flat Top division of that road in 1889, and in 1890 was appointed Superintendent of the Pocahontas division. In 1901 he went to the Seaboard Air Line as General Superintendent at Portsmouth, Va., and two years later returned to the Norfolk & Western as General Superintendent. In the spring of 1904 he was appointed General Manager, the position he holds at present.

Oregon Railroad & Navigation.—See *Corvallis & Eastern*.

Operating Officers.

Atchison, Topeka & Santa Fe.—D. Dugan has been appointed Superintendent of Terminals at Albuquerque, N. Mex.

Baltimore & Ohio.—J. Root, formerly chief despatcher at Cleveland, Ohio, has been appointed Assistant Trainmaster at that place.

Chicago, Milwaukee & St. Paul.—H. B. Earling, Assistant General Superintendent at Minneapolis, Minn., has been appointed General Superintendent of Western Lines, including the Pacific extension, with office at Butte, Mont.

R. P. Edson, Trainmaster at Mason City, Iowa, has been appointed Superintendent of the Western division. A. C. Peterson, Trainmaster at Mitchell, S. Dak., succeeds Mr. Edson.

Cleveland, Cincinnati, Chicago & St. Louis.—E. M. Costin, Trainmaster at Terre Haute, Ind., has been appointed Superintendent at Cleveland, Ohio, succeeding A. S. Ingalls, promoted. W. L. Lampert, Assistant Trainmaster at Terre Haute, succeeds Mr. Costin.

Erie.—J. C. Tucker, who recently resigned as Superintendent of the Rochester division on account of ill health, has been appointed General Inspector of Traffic, with office at Jersey City, N. J.

Hidalgo & Northeastern.—See *National Lines of Mexico*.

Interoceanic of Mexico.—See *National Lines of Mexico*.

National Lines of Mexico.—F. W. Baldwin, Superintendent of Transportation of the Interoceanic of Mexico, has been appointed General Superintendent in charge of the Interoceanic of Mexico, the Hidalgo & Northeastern, and the narrow-gage lines of the National Railroad of Mexico.

National Railroad of Mexico.—See *National Lines of Mexico*.

New York Central & Hudson River.—E. T. Hopkins has been appointed Trainmaster of the Richland district of the Rome, Watertown & Ogdensburg division. B. J. Wollaver, assistant chief despatcher of the Watertown district of the R. W. & O. division, has been appointed Assistant Trainmaster of that district.

Northern Pacific.—J. C. Roth has been appointed Assistant Superintendent of Transportation, with office at Tacoma, Wash. P. H. McCauley has been appointed Car Accountant, with office at St. Paul, Minn.

St. Louis & San Francisco.—H. F. Clark, Superintendent at Neodesha, Kan., has been appointed Superintendent at Sapulpa, Ind. T., succeeding R. V. Miller, resigned. Le Roy Kramer, Assistant to the Second Vice-President, succeeds Mr. Clark. George Geiger, who resigned as Superintendent of the Rio Grande Western last March, has been appointed Superintendent of the St. Louis & San Francisco, with office at Francis, Ind. T., succeeding J. W. Walton, recently appointed Superintendent of Transportation of the Missouri, Kansas & Texas of Texas.



N. D. Maher.

Western & Atlantic.—Otto Best has been appointed to the new office of Superintendent of Terminals at Atlanta, Ga.

Traffic Officers.

Baltimore & Ohio.—J. W. Purner, commercial freight agent at New York, has been made also Acting General Eastern Freight Agent at New York.

New York & Ottawa.—H. K. Gays, Assistant General Passenger Agent, has been appointed General Passenger Agent, with office at Ottawa, Ont.

Engineering and Rolling Stock Officers.

Colorado Midland.—See *Denver & Rio Grande*.

Denver & Rio Grande.—W. H. Chambers, Assistant Master Mechanic of the Denver & Rio Grande at Helper, Utah, has been appointed to the new office of Master Mechanic at Grand Junction, Colo., of the Denver & Rio Grande, the Rio Grande Western and the Colorado Midland.

Erie.—W. E. Hebard has been appointed Engineer of the Buffalo division, with office at Buffalo, N. Y., succeeding W. B. Taylor, resigned.

Grand Trunk.—See *Iowa Central*.

Hidalgo & Northeastern.—See *National Lines of Mexico*.

Interoceanic of Mexico.—See *National Lines of Mexico*.

Iowa Central.—H. G. Kelley, Chief Engineer of the Iowa Central and of the Minneapolis & St. Louis, has resigned to go to the Grand Trunk, effective June 30.

Isthmian Canal Commission.—Joseph Ripley, Principal Assistant Engineer, has resigned, effective July 6, to go into private business in the United States.

Mexican International.—See *National Lines of Mexico*.

Minneapolis & St. Louis.—See *Iowa Central*.

National Lines of Mexico.—J. M. Reed, Chief Engineer of the National Railroad of Mexico, has been appointed Chief Engineer of Construction of the National Lines of Mexico. H. L. Cumming, Assistant Chief Engineer of the National Railroad of Mexico, has been appointed Assistant Chief Engineer of Maintenance of Way of the National Lines of Mexico in charge of maintenance of way of the Mexican International and of the standard gage lines of the National Railroad of Mexico. W. T. Ingram, Chief Engineer of the Interoceanic of Mexico, has been appointed Engineer of Maintenance of Way of the National Lines of Mexico in charge of maintenance of way of the Interoceanic of Mexico, the Hidalgo & Northeastern, and the narrow-gage lines of the National of Mexico.

National Railroad of Mexico.—See *National Lines of Mexico*.

Rio Grande Western.—See *Denver & Rio Grande*.

St. Louis, Iron Mountain & Southern.—P. Carroll, Division Engineer at De Soto, Mo., has been appointed Division Engineer at Little Rock, Ark., succeeding J. F. Peters, transferred to the Principal Assistant Engineer's office at St. Louis. E. C. Welch succeeds Mr. Carroll. J. A. Wright, roadmaster of the Valley division, has been appointed Division Engineer at Ferriday, La., succeeding J. A. Simmons, resigned.

LOCOMOTIVE BUILDING.

The Buffalo, Rochester & Pittsburg has ordered from the American Locomotive Company, for December delivery, 10 consolidation locomotives with cylinders 21 in. x 28 in.

The Norwood & St. Lawrence, as reported in our advance sheet of June 19, has ordered one simple mogul locomotive from the American Locomotive Company for October, 1907, delivery.

General Dimensions.

Type of locomotive	Mogul
Weight on drivers	110,000 lbs.
Weight, total	128,000 "
Diameter of cylinders	19 in.
Stroke of pistons	26 "
Diameter of drivers	56 "
Boiler, type	Extended wagon top
" working steam pressure	180 lbs.
" heating surface, total	1,610 sq. ft.
" tubes, number	about 200
" " outside diameter	2 in.
" length	12 ft. 2 "
Firebox, length	108 "
Firebox, width	40 "
Grate area	30 sq. ft.
Tank capacity	3,500 gals.
Coal capacity	6 tons

Special Equipment.

Couplers	Tower
Injector	Nathan
Safety valve	Coale
Sanding devices	Leach pneumatic
Sight-feed lubricators	Nathan
Spring	American Locomotive Co.
Steam gages	Ashcroft

CAR BUILDING.

O. F. Wasendorff, Lewiston, Montana, is said to be in the market for 30 dump cars.

The Atlantic, Quebec & Western is said to be in the market for freight equipment.

The Armour Car Lines, Chicago, have ordered 35 tank cars from the Bettendorf Axle Company.

The Morris & Company Tank Car Line, Chicago, has ordered 10 tank cars from the Bettendorf Axle Company.

The Las Vegas & Tonopah recently ordered three coaches and three baggage cars from the Pullman Company.

The Doud Stock Car Company, Chicago, is building at its own shops 100 stock cars, for which it is now buying material.

The Texas & Pacific, it is understood, has ordered 3,000 box cars of 80,000 lbs. capacity from the American Car & Foundry Co.

The Mexican Plantation Company, Los Angeles, Cal., is said to have ordered 10 tank cars from the Pressed Steel Car Company.

The Penn & Franklin Street Railway, which is building a line from Wilkinsburg, Pa., to East Pittsburg, has ordered 10 closed cars from the St. Louis Car Company.

The Waterloo, Cedar Falls & Northern has ordered seven single truck closed cars from the McGuire Cummings Manufacturing Co., for October delivery. These cars will weigh 10 tons and measure 20 ft. long and 7 ft. 6 in. wide, inside measurements.

The Buffalo, Rochester & Pittsburg has ordered 500 50-ton all steel gondola cars from the Standard Steel Car Company for December delivery; 250 50-ton all steel gondola cars and 250 40-ton gondola cars, 41 ft. long, inside measurements, with 30-in. sides and drop ends, from the American Car & Foundry Company, for October delivery.

The Lake Shore & Michigan Southern is building 10 automobile baggage cars at its Collinwood shops. These cars will measure 60 ft. long and 9 ft. 8 in. wide, over sills, and 14 ft. 6 in. high, over all. The special equipment includes:

Brakes	Westinghouse
Draft rigging	Gould
Heating System	Gold
Light	Pintsch
Platforms	Gould
Wheels	Paige

RAILROAD STRUCTURES.

BUFFALO, N. Y.—The principal roads entering Buffalo have submitted a plan to spend about \$12,000,000 on a union passenger station and connections in that city on condition that the city shall widen certain streets, and shall spend \$1,000,000 for new streets and approaches, and, furthermore, pay about 35 per cent. of the cost of eliminating grade crossings.

CINCINNATI, OHIO.—The Cincinnati Southern, it is said, has decided to start preliminary work for the construction of a viaduct approach. This does not include laying tracks for the Front street terminals. Plans for the latter are under way.

COLUMBUS, OHIO.—The City Council has passed an ordinance authorizing an issue of \$1,000,000 in bonds to secure funds to be used for the elimination of grade crossings. The railroads interested are to pay an additional \$1,000,000 towards the work.

KANSAS CITY, Mo.—A special election is to be held next fall to allow the voters to decide whether the Kansas Terminal Railway Company shall be granted a 200-year franchise as agreed between the city officials and the railroads interested. The company is to build the proposed new union passenger station and passenger terminals at a cost of between \$15,000,000 and \$20,000,000. There will probably be considerable delay in disposing of bonds of the railroad companies sufficient to carry out the work. About \$2,000,000 has already been contributed by the railroads for the right of way for the proposed belt line, and bonds cannot be issued until the franchise is granted by the municipality of Kansas City.

LAREDO, TEX.—Plans, it is said, have been made by the National of Mexico to build a second bridge over the Rio Grande river here, to cost \$500,000.

LOGAN, OHIO.—The Hocking Valley has given an order to the Mount Vernon Bridge Company for the structural steel to be used in its new shops. The buildings include a power house 60 ft. x 120 ft.; carpenter shops, 60 ft. x 120 ft.; office and store-rooms, 25 ft. x 50 ft.; pipe and tin shops, 30 ft. x 50 ft., and lumber driers, 40 ft. x 50 ft. The buildings will be of structural steel and brick and equipped with modern machinery. Contract for the main shop building is also let to the Mount Vernon Bridge Company.

MCKEESPORT, PA.—Contract is reported let by the McKeesport & Port Vue Bridge Company to the Dravo Construction Company for building a steel bridge over the Baltimore & Ohio tracks at Fifteenth

avenue and Walnut street. The bridge, which is to carry street cars, is to cost \$150,000.

MCKEES ROCKS, PA.—The Pittsburg & Lake Erie has bought 10 acres of ground near its shops at this place as a site for new buildings.

NEW CASTLE, PA.—Local reports state that the Pennsylvania is planning to spend \$250,000 for a new electric power plant and roundhouse here.

NEW YORK, N. Y.—The car barn of the Metropolitan Street Railway Company at 85th street was recently damaged by a recent fire; loss about \$200,000.

ST. THOMAS, ONT.—The Pere Marquette has plans made for enlarging its division shops here, also to put up a new 24-stall roundhouse and remodel its old roundhouse into a car repair shop.

SHIRE OAKS, PA.—The Pennsylvania Railroad has just finished a new roundhouse of concrete and cement, with a plaster superstructure, at this place, which is on the Monongahela division. Owing to the corrosion of steel from engine gases, the interior of the building is finished in wood. There are nine stalls.

TUCUMCARI, N. MEX.—The El Paso & Southwestern, it is said, will abandon its shops at Santa Rosa and put up new ones at this place. A site has already been selected and land bought. When the shops are finished it is proposed to make this place a division point.

WICHITA, KAN.—The Kansas City, Mexico & Orient, it is said, has bought land as a site for a new freight house to cost \$30,000.

WINNIPEG, MAN.—Contract is reported let to S. Brown by the Canadian Northern for shops to cost about \$210,000. The work includes a blacksmith shop 100 ft. x 144 ft., a planing mill 100 ft. x 144 ft., and a car repair shop 100 ft. x 192 ft.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—An officer writes that work on the Western Oklahoma from Alston, Okla., southeast to Seiling, 32 miles, was stopped about two months ago, and the project abandoned, on account of adverse legislation in Oklahoma. (March 15, p. 379.)

Contracts are reported let by this company to A. Moore, of Newton, Kan., for reconstructing 36 miles of its road from Woodward, Okla., west towards Higgins, Tex.

ATLANTIC & LAKE SUPERIOR.—See Atlantic, Quebec & Western.

ATLANTIC, QUEBEC & WESTERN.—In connection with the recent sale to this company of the Atlantic & Lake Superior, plans have been made to establish a new Atlantic coast terminal at Gaspe, Que. The Atlantic & Lake Superior operates about 100 miles from the Intercolonial at Metapedia east to Paspebiac. It is intended to extend the road from Paspebiac northeast to Gaspe, approximately 75 miles. The Atlantic, Quebec & Western was incorporated last year to build from Gaspe west to Amqui, thence south to a point on the St. John river, about 260 miles. Charles Brien and Joseph Lavoie, of Gaspe, are directors. The offices of the company are in London, England. (March 15, p. 394.)

BALTIMORE & OHIO.—The old main line of this company between Relay, Md., and Washington Junction has been practically rebuilt during the past eight years and transformed from a line with many curves and steep grades to one of easy curvature and light grades. The distance has been considerably shortened and is now about 58 miles. The improvements cost over \$3,000,000. The work involved straightening the line between Orange Grove and Ilchester by building an entire new line for seven-eighths of a mile and a double-track tunnel about a quarter of a mile long, arched throughout, also a new bridge over the Patapsco river and a county road on the west side of the river. The work west of Oella and at Union Dam, for about a mile, involved the construction of a double-track tunnel at Union Dam, over an eighth of a mile long. At Hollofields passenger sidings were built for east and westbound traffic, together with signal towers and interlocking. About 90 per cent. of the Alberton improvement is finished; this involves an entire change in alignment from a point west of Hollofields to a point near Davis station, about three miles. The present roadbed will be abandoned except for about a half mile east of Alberton, where it will be raised and straightened. At Henryton the tunnel was widened to the standard size and arched throughout. Between Sykesville and Gaither there was extensive straightening, and new tracks, an interlocking, two bridges and a 250-ft. tunnel were built. Between Morgan and Woodbine the work involved the construction of a double-track tunnel 285 ft. long. To reduce the grade over Parr's Ridge at Mt. Airy a new line was built between Watersville and Monrovia, 11 miles. Between Ijamsville and Frederick Junction, four miles, the grades were also lightened, and a coaling plant, water station, 13,000 ft. of passing sidings and interlocking tower and switches were constructed; also a double-track tunnel 210 ft.

long and five steel girder bridges. Grade improvements were also made between Frederick Junction and Buckeyestown for a distance of one mile. To facilitate the movement of eastbound traffic a single-track detour line was built between Adamstown and Washington Junction, nearly six miles, an increase in distance of two miles over the old line, but reducing the grade from 39 ft. to 15.8 ft. per mile, enabling a full train of 2,500 tons to be moved with one locomotive between Brunswick Yard and Reel's Mills. This line is used entirely for heavy eastbound trains.

BILOXI GREAT NORTHERN.—Under this name a company is being organized in Mississippi to build a line from Biloxi north to a connection with the Mobile & Ohio at Bucatunna, 80 miles. W. M. Dukati is to be President; J. B. Chinn, Vice-President; W. Gorenflo, Treasurer, and I. Heidemheim, Secretary. W. L. Covel is also interested. The headquarters of the company will be at Biloxi.

BUFFALO, GENESEE & ROCHESTER (ELECTRIC).—The New York State Railroad Commission has granted a certificate of necessity to this company, which proposes to build a double track street railway from Depew, N. Y., to Rochester, 60 miles. The company will also take over the Buffalo & Depew, which is now in operation. The road will run through the towns and villages of Lancaster, Crittenden, Corfu, Batavia, LeRoy and Chili. The capital stock is \$7,500,000. The commission has also consented to a mortgage for \$5,000,000. (May 31, p. 759.)

BUFFALO & DEPEW (ELECTRIC).—See Buffalo, Genesee & Rochester.

CANADIAN PACIFIC.—Contracts are reported let to William Dixon and Gourley Hutchinson, of Dryden, Ont., for double-tracking the main line of this road between Wabigoon and Barclay, about 10 miles.

CENTRALIA & SANDOVAL (ELECTRIC).—Incorporated in Illinois to build an electric line from Centralia north parallel to the Illinois Central, to Sandoval, eight miles. The incorporators include: W. M. Warneck, G. D. Burroughs, of Edwardsville; F. Noleman and E. R. List, of Centralia, and F. E. Allen, of St. Louis.

ELKIN & ALLEGHENY.—This company, which proposes to build a line from Elkin, N. C., on the Southern Railway northwest to Marion, Va., on the Norfolk & Western, about 80 miles, is making surveys and securing the right of way. Grading, it is expected, will be started next month. J. W. Stevens, Chief Engineer, Elkin.

FREDERICK & MIDDLETOWN ELECTRIC.—See Frederick Interurban.

FREDERICK INTERURBAN (Md.).—This company was recently incorporated in Maryland as a consolidation of the Frederick & Middletown Electric Railway and the Jefferson & Braddock Heights, the latter having recently finished its line. The new company will operate the Myersville & Catoctin Railway now operated by the Frederick & Middletown, and will connect Frederick, Middletown, Braddock and Jefferson. The question of building an extension from Jefferson southwest to Brunswick is under consideration.

GRAND TRUNK PACIFIC.—Contracts are reported let to Treat & Johnson, of Winnipeg, for building 51 miles of line between Winnipeg and Portage la Prairie.

HORNELL, BATH & LAKE KEUKA (ELECTRIC).—A certificate of necessity has been granted this company by the New York Board of Railroad Commissioners to build an electric line from Hornell, N. Y., east to Bath, thence northeast via Hammondsport to Branchport, 50 miles. (March 15, p. 385.)

HUDSON BAY PACIFIC.—It is reported that this company has been organized in Seattle, Wash., with \$100,000,000 capital, to build from Hudson Bay west to Port Simpson, on the Pacific coast. David B. May, Secretary, Seattle, Wash.

JEFFERSON & BRADDOCK HEIGHTS COMPANY (ELECTRIC).—See Frederick Interurban.

JOPLIN & PITTSBURG.—Incorporated in Missouri, with \$5,000,000, to build 150 miles of railroad from Joplin, Mo., north and west, traversing Jasper county, Mo., and Crawford, Cherokee and Labette counties in Kansas. The incorporators include: Fred H. Fitch, Pittsburg, Kan.; H. W. Noble, Detroit, Mich.; D. L. Robinson, Buffalo, N. Y.; John W. W. Ground, William W. Calhoun and Thomas Kirwin, Carthage, and Joseph J. Heiman, John A. Prescott, R. E. Richardson, C. G. Hutchinson and E. C. Wright, Kansas City.

KALAMAZOO, LAKE SHORE & CHICAGO.—This company, it is said, will build a branch from Toquon, Mich., southwest to Pawpaw Lake, 4½ miles. New station and terminal yards are to be built at Kalamazoo and at South Haven.

KANSAS CITY, MEXICO & ORIENT.—Rights of way, it is reported, are being secured by this company for a proposed branch from Sentinel, in Washita County, Okla., southeast to Lawton, about 70 miles. The proposed route from Lawton is through Fort Sill reservation, thence following Medicine creek via Saddle mountain and Hobart to Sentinel. An extension of this branch from Lawton east to Sulphur, about 100 miles, is also projected.

LOUISVILLE & NASHVILLE.—It is said that the Louisville & Nashville will build a large freight yard 350 ft. wide and two miles long on land already bought, at Gentilly, La.; also an auxiliary yard. Work is to be started at once.

MILWAUKEE & NORTHERN (ELECTRIC).—Local reports state that this company and the Sheboygan Heat, Light & Traction Company have been consolidated under one management. This, it is said, indicates that the proposed electric line from Milwaukee via Port Washington to Sheboygan will be built.

NORTHERN EMPIRE.—Application is being made by this company to the Dominion Parliament for a charter to build a line from the international boundary, near Cardston, Alb., north through Lethbridge, Fort McMurray, Fort Vermilion and the Yukon territory to a point on the international boundary between Yukon territory and Alaska. J. B. T. Caron, Ottawa, is solicitor for the applicants.

PENSACOLA, ALABAMA & WESTERN.—Bids are wanted July 10, by the Interstate Contract Company, 224 Brent building, Pensacola, Fla., for grading 20 miles of line on the Andalusia division, also for 20 miles on the Atmore division, as noted on advertising page 22.

PERLA NORTHERN.—An officer writes that this company, which operates 18 miles of road from Perla, Ark., north via Magnet and Lonsdale to Whittington, is building with its own forces an extension northwest to a point not yet determined upon. From the southern terminus at Perla there is a branch running east to Gifford, and another branch is under construction from Perla southeast to a junction with the Wyandotte & Southeastern on the eastern boundary of Hot Springs County.

ST. JOSEPH & NODAWAY VALLEY.—Surveys reported made for this proposed line from St. Joseph, Mo., north via Savannah, Fillmore and Graham to Tarkio, in Atchison County, 78 miles. J. W. Brockett, Chief Engineer, St. Joseph, Mo.

ST. LOUIS & SAN FRANCISCO.—An officer writes that surveys are being made for a connecting line from Okmulgee, Ind. T., to Shawnee, Okla., approximately 70 miles. The line will be located in about 60 days, when bids will be asked for the work.

SALVATIERRA & WESTERN.—This company, which proposes to build a line from Salvatierra, in the state of Guanajuato, Mex., west to Puruandiro, in the state of Michoacan, about 50 miles, is making preliminary surveys. This line is to be built under a concession given to Andres Bermejillo, of Mexico City. Connection is to be made with the National of Mexico at Salvatierra. C. A. Malau is Chief Engineer.

SHEBOYGAN HEAT, LIGHT & TRACTION COMPANY.—See Milwaukee & Northern (Electric).

TERRE HAUTE & MEROM (ELECTRIC).—An officer writes that this Company, which was recently incorporated in Indiana, will let contracts within two or three months for building its proposed electric line from Terre Haute, Ind., south via Princeton, Middletown, Fairbanks and Graysville to Merom, about 35 miles. L. Brown, President, Fifth and Main streets, and J. Caswell, Chief Engineer, Terre Haute, Ind. (June 14, p. 879.)

TEXAS CENTRAL.—Announcement is made that this company will build a branch from Dublin, Tex., north to Thurber, about 30 miles, to reach extensive coal fields near that city. It is probable that the proposed branch will be extended further north to a connection with the Fort Worth & Denver City, either at Wichita Falls or Vernon, about 100 miles.

WASHINGTON ROADS (ELECTRIC).—According to local reports, Stone & Webster, of Boston, Mass., have bought the holdings and franchises of the Everett Electric Company. This purchase, it is said, insures the building of an electric line from Tacoma north to Vancouver, B. C.

WESTERN OKLAHOMA.—See Atchison, Topeka & Santa Fe.

RAILROAD CORPORATION NEWS.

BANGOR & AROOSTOOK.—This company has asked the Maine State Railroad Commission for permission to increase its capital stock from \$1,550,000 to \$2,342,000. The new stock is to be used to buy the capital stock of the Northern Maine Seaport Railroad & Terminal and that of the Schoodic Stream Railroad; both companies are now operated by the Bangor & Aroostook. The Northern Maine Seaport was recently built as an extension from La Grange, Me., south to Searsport, 54 miles, and the Schoodic Stream Railroad is a branch line connecting with the Bangor & Aroostook near Milo.

BOSTON & MAINE.—See New York, New Haven & Hartford.

BUFFALO & SUSQUEHANNA.—After July 1 this company will use the New York Central passenger station at Buffalo, entering the city over the Lake Shore tracks from Blasdell, two miles south.

At present the company uses the Erie passenger station, which it reaches over the Erie's line from Hamburg, 12 miles south. (Feb. 8, p. 196.)

CENTRAL OF GEORGIA.—Adrian H. Joline, Chairman of the Richmond Terminal Company reorganization committee, announced on June 26 that the committee had sold the \$5,000,000 capital stock of the Central of Georgia, which it held, to Oakleigh Thorne, President of the Trust Company of America, and Marsden J. Perry, of Providence, R. I. The proceeds of the sale will be paid to the Southern. It has been supposed that this stock was held in the interests of the Southern, but this has not hitherto been officially admitted.

CENTRAL NEW ENGLAND.—The Newburgh, Dutchess & Connecticut, the Dutchess County Railway, and the Poughkeepsie & Eastern have been merged with the Central New England. The Central New England runs from Campbell Hall, N. Y., across the Hudson river at Poughkeepsie by its own bridge to Silvernails, 58 miles, with an 18-mile branch, and also leases and controls the Hartford & Connecticut Western, which runs from Hartford to Rhinecliff, 109 miles. It has heretofore leased the Dutchess County Railway, running from Poughkeepsie to Hopewell Junction, 12 miles, and the Newburgh, Dutchess & Connecticut, Dutchess Junction, N. Y., to Millerton, 59 miles. The Poughkeepsie & Eastern was bought by the New York, New Haven & Hartford last spring. It runs from Boston Corners to Poughkeepsie, 40 miles.

CHESAPEAKE & OHIO.—Plans are under way for authorizing about \$25,000,000 bonds. It is probable that they will not be issued for the present except as collateral for note issues. It is reported that about \$6,000,000 notes may be sold soon.

CHICAGO & EASTERN ILLINOIS.—Speyer & Co. and Goldman, Sachs & Co. have formed a syndicate to underwrite an issue of 5 per cent. bonds, which is to be made to refund the \$2,655,900 6 per cent. first mortgage bonds due December 1, 1907.

CHICAGO, INDIANA & SOUTHERN.—See New York Central Lines.

CHICAGO, INDIANAPOLIS & EVANSVILLE.—A mortgage for \$15,000,000 in favor of the Western Trust & Savings Bank, Chicago, and securing a bond issue of equal amount, has been filed in Indianapolis by the promoters of this road, which is projected to run from Chicago south to Evansville, Ind., through Indianapolis, with branches to Gary, South Bend and to Owensville, Ky.

CHICAGO JUNCTION.—See New York Central Lines.

CINCINNATI, HAMILTON & DAYTON.—The Receiver has been given permission to extend for one year the time for the payment of the \$1,023,660 receivers' certificates falling due July 1, 1907. In asking for the extension, the Receiver said that a reorganization of the company's affairs was under way, and that through it the receivers' certificates would be paid in full before July 1, 1908.

DUTCHESS COUNTY RAILWAY.—See Central New England.

ERIE.—See Buffalo & Susquehanna.

INDIANA HARBOR (BELT).—See New York Central Lines.

KANSAS CITY SOUTHERN.—Gross earnings for May were \$866,468, an increase of \$100,815; net earnings, less taxes, \$350,205, an increase of \$102,094. Gross earnings for 11 months ended May 31 were \$8,414,456, an increase of \$1,323,545; net earnings, less taxes, \$3,261,182, an increase of \$1,490,115.

LAKE SHORE & MICHIGAN SOUTHERN.—See Buffalo & Susquehanna.

LONG ISLAND RAILROAD.—James H. Vandewater has applied to the Attorney-General of New York to bring action against the Long Island Railroad to have the franchises of the Jamaica & South Shore branch declared forfeited. It is contended that the branch, which is about 10 miles long, has been abandoned since 1879 and that only recently track-laying on its right of way was begun to prevent possible competition.

MISSOURI, KANSAS & TEXAS.—Spencer Trask & Co., Mackay & Co. and the Mercantile Trust Company of St. Louis are offering jointly \$2,500,000 general mortgage 4½ per cent. sinking fund bonds at 84½ and interest, yielding about 5.60 per cent. The bonds are part of an outstanding issue of \$10,000,000 sold last year. The authorized issue is \$20,000,000.

MOHAWK VALLEY.—See Utica & Mohawk Valley.

NANTUCKET CENTRAL.—This 3-ft. gage road, 8½ miles long, running from Nantucket, Mass., to Siasconsett, has been sold by its owner, Delmont L. Weeks, of Boston, to a syndicate represented by Thomas J. Macey, of New York. The road is usually operated only for four months in the summer, and was not operated at all last year. The price paid is reported to be \$12,000.

NEWBURGH, DUTCHESS & CONNECTICUT.—See Central New England.

NEW YORK CENTRAL LINES.—New York Central interests have taken

a lease, effective July 1, on the Chicago Junction Railway's belt line around Chicago from Whiting, Ind., to Franklin Park, Ill., 27 miles, and have also taken an option on this property. It is understood that there is no question but that the option will be exercised and the line ultimately turned over to some New York Central line, probably the Chicago, Indiana & Southern or the Indiana Harbor (Belt). In addition to the line referred to above, the Chicago Junction operates a branch from Chappell, Ill., to the Union Stock Yards, and leases and has trackage rights over other roads, but these lines are not included in the New York Central deal. The entire \$2,200,000 capital stock of the Chicago Junction is owned by the Chicago Junction Railways & Union Stock Yards Company.

NEW YORK, NEW HAVEN & HARTFORD.—A bill restraining the consolidation of the Boston & Maine with this company until after the next Massachusetts Legislature can act has passed the lower house and now goes to the Senate. The bill provides that the New Haven shall not assume control of the Boston & Maine, nor shall anyone connected with the New Haven hold office on the Boston & Maine, nor vote any share of Boston & Maine stock until the next legislature takes action. See Central New England; also Old Colony.

NORTHERN MAINE SEAPORT.—See Bangor & Aroostook.

NORTHERN MAINE SEAPORT RAILROAD & TERMINAL.—See Bangor & Aroostook.

OLD COLONY RAILROAD.—The Governor of Massachusetts has signed a bill authorizing this company to buy the Boston & Providence, which runs from Boston, Mass., to Providence, R. I., 63 miles, including branches. It is leased to the N. Y., N. H. & H. through the Old Colony.

PERE MARQUETTE.—The plan for reorganization includes, in addition to the details reported in the *Railroad Gazette* of June 21, the offering of part of the proposed issue of 5-year, 6 per cent. notes to common stockholders to the extent of 20 per cent. of their present holdings. The common stockholders are to exchange their holdings for an equal amount of new common stock plus an additional amount of new common stock equal to the par value of the notes for which they subscribe.

PHILADELPHIA, BALTIMORE & WASHINGTON.—It is denied that the meeting of stockholders called for July 31 has any connection with a consolidation of Pennsylvania lines in Maryland.

POUGHKEEPSIE & EASTERN.—See Central New England.

ST. LOUIS & SAN FRANCISCO.—A meeting of the stockholders has been called for August 27 to authorize \$115,000,000 general lien, 5 per cent. bonds of 1927, redeemable prior to May 1, 1922, at 102½ and interest, and afterwards at par and interest. Of the total amount, \$67,818,000 will be reserved for refunding; \$10,000,000 is to be issued during the next two years for additions and improvements, and the rest is to be issued only after June 1, 1909, as follows: for improvements and betterments, \$27,182,000 at the rate of \$2,500,000 a year until 1911, and after that at the rate of \$3,000,000 a year; to refund future equipment notes, \$5,000,000 to the extent of 6 per cent. of the face value of the notes; and for construction and new lines, \$5,000,000. The new mortgage will be a first lien on the road built or acquired by the proceeds of the sale of the new bonds; also on 1,526 miles of road on which the bonds to be refunded now have a lien, and, subject to existing mortgages, on the 3,798 miles of road leased or controlled by the company. The stockholders will also be asked to authorize an increase in the capital stock from \$100,000,000 to \$200,000,000, a formality necessary because the Missouri laws require that the bonded debt shall not be greater than the capital stock.

SCHOODIC STREAM RAILROAD.—See Bangor & Aroostook.

SOUTHERN.—See Central of Georgia.

TEXAS CENTRAL.—The suit brought by the Texas Railroad Commission for the cancellation of \$650,000 outstanding bonds has been dismissed. The commission contended that the bonds were illegal because it had not consented to their issue on the ground that the value of the road on which the bonds were secured was less than the outstanding capital stock. (Nov. 1, 1906, p. 124.)

TEXAS & PACIFIC.—This company has sold to Blair & Co. \$3,100,000 10-year, 5 per cent. equipment notes maturing in 20 equal semi-annual instalments, and \$450,000 Louisiana division first mortgage bonds. The proceeds of the Louisiana division bonds will cover extensions completed in Louisiana.

UTICA & MOHAWK VALLEY (ELECTRIC).—This company, whose road runs from Utica, N. Y., to Rome and other points, 109 miles, has been given permission to increase its common stock from \$6,250,000 to \$7,500,000 to pay for work under way. The company is controlled by the Mohawk Valley Co.

